REPORT

of the

Commission on Conservation of Natural Resources

to the

Governor of Maryland

In Compliance with Senate Joint Resolution No. 3,
Laws of Maryland, Extraordinary Session, 1948

December 1, 1948

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To The Honorable Wm. Preston Lane, Jr.
Governor of Maryland

Sir:

In this report your Commission is dealing with a substantial part of the wealth and welfare of the State of Maryland. What we do with our manageable resources of soils, forests and waters, affects not only the tax rate but also the employment situation, and, directly or indirectly, the standard of living that the State is able to maintain both now and in the future.

In this day and age natural resources cannot be left to unrestricted or wasteful use. Continuing wise development is the central objective in the care and harvesting of all natural resources. This means that the citizens of the State must define the boundary between the area of personal liberty and the area of social control in the use of natural resources. Conflicts of interest increase in number with increase of population and pressure upon the food supply. It is inevitable that such conflicts should lead to the restudy from time to time of the conditions of social control, the adequacy of existing laws, and, in the present case, the means for stricter law enforcement. In dealing with resource development there is no one heroic solution good for all time. Ours is not a static society. As conditions change, policies must change with them.

In broad terms we can only be as secure as the society in which we live. The continuing wise use of our natural resources is one way of increasing the security of all of us. The welfare of our children and grandchildren is determined in large part by the decisions that we now make from year to year respecting the use of such resources. Some are being rapidly depleted, particularly those of the Chesapeake Bay. As a result, every consumer of the products of the Bay must pay a higher price for fish prod-

ucts, indeed a prohibitive price if present trends are not reversed. Disorderly and unfair practices have arisen in the recovery of the wealth of the Bay. Unless they are corrected all along the line, the State is heading for still higher costs and diminishing returns on resource management and production in the Bay area.

There are many conditions of our complex modern society that raise apparently insoluble problems but we are dealing here with problems that are manageable and that we can solve by thought, by adequate legal provisions, and by firm administration on the part of the responsible commissions and departments of the State.

II.

By Joint Resolution, in May, 1948, the General Assembly requested the Governor to appoint a Commission of not more than nine members to study the conservation question. The Commission was specifically authorized and directed "to make a study of the laws of this State relating to the conservation of natural resources, with particular reference to the Department of Tidewater Fisheries," and to recommend any changes deemed necessary. The full text of the resolution will be found in Appendix I.

The Commission at its first meeting on July 24, 1948, after consideration of the Joint Resolution calling for its appointment, and after general discussion of Maryland's natural resource problems, decided to survey certain of the most critical aspects of the State's guardianship of its natural resources, as follows:

(1) Administrative organization, with particular reference to the Board of Natural Resources and the Department of Tidewater Fisheries;

(2) oyster depletion, with a view to formulating a program for increasing annual production;

(3) surface and underground water depletion;

(4) forest depletion, including its relationship to the water problem;

(5) soil depletion, including its relationship to the water problem; and

(6) law enforcement, in particular the laws relating to tidewater fisheries.

Committees were appointed to study and report on the above six problems. The Committee reports are printed as appendices to this Report.

The first committee reports were presented at a meeting held on September 25. Thorough discussion of the preliminary findings took place and agreements were reached on certain recommendations. Further studies and recommendations were considered at a meeting of the Commission on October 16 and again on October 30 and November 26. On November 26 a public hearing was held at Annapolis, Maryland, to which were invited any who had not been consulted by the several committees and who desired to be heard. Following the initial organization meeting of July 24, all meetings of the Commission were open to the public, and members of the press were invited to attend.

The Commission did not have the time or the facilities to study all phases of the State's guardianship of its natural resources. Furthermore, such a study is a continuing task which should be conducted by a permanent agency such as the Board of Natural Resources. The Commission also concluded, for the same reasons, that the detailed laws and regulations relating to particular resources should be determined by the Board of Natural Resources and subordinate conservation departments, and by the legislature acting on the recommendation of such administrative agencies.

The Commission familiarized itself with the work of the Chesapeake-Potomac Study Commission and of the Chesapeake Bay Institute. The Commission did not make a study of problems relating to crabs and migratory fish.

III.

The recommendations of the Commission are as follows:

Recommendations On The Board of Natural Resources

It is recommended that the Board of Natural Resources consist of sixteen members, the five chairmen of commissions* dealing with natural resources, the five directors of corresponding departments, five representatives of the public at large, and the director. The chairman should be appointed by the Governor from among the public representatives. The terms of office of the five public representatives should be for five years on a staggered basis, thus providing for the appointment of one public representative each year.

The duties of the Board of Natural Resources should be to review the operations of the several commissions and departments and to coordinate their activities.

There should be appointed by the Board of Natural Resources a director who should serve at the pleasure of the Board and receive a substantial salary. The director should be ex officio a member of the Board of Natural Resources and the five commissions dealing with natural resources. The Board should also be empowered to employ a secretary.

Recommendations On The Commission of Tidewater Fisheries

The Commission of Tidewater Fisheries should consist of five members appointed by the Governor. The members of the Commission should receive no compensation for their services but should be reimbursed for their expenses. The chairman should be selected by the members themselves, as in the case of the other four commissions dealing with natural resources. The terms of office of the members

* Commission of Tidewater Fisheries, Game and Inland Fish Commission, Commission of State Forests and Parks, Commission of Geology, Mines, and Water Resources, and Commission of Research and Education.

should be for five years on a staggered basis, thus providing for the appointment of one member each year.

The Commission should select a paid director who should devote his entire time to the management and direction of the operations of the department in accordance with policies established by the Commission. The salary of the director should be substantial and sufficient to permit the appointment of a man of experience. Appointment and tenure in office should be at the pleasure of the Commission except that removal should be only for cause after notice and hearing by the Commission with the right of review by the Board of Natural Resources whose action should be final.

It is also recommended that the Commission of Tidewater Fisheries be empowered to promulgate rules and regulations with respect to fish and oysters similar to the authority already conferred upon it with respect to crabs, any such rules and regulations to be subject to review by the Board of Natural Resources.

Recommendations for Rehabilitation of the Oyster Industry

After the Commission of Tidewater Fisheries has been reorganized as suggested above, we recommend the adoption and vigorous administration of a long-range plan (computed on the basis of fifteen years or more) for rehabilitation of the oyster industry, which should include the following:

1) Repeal of the 20 percent shell tax law and enactment of a law requiring every packer or processor to sell and the State to purchase at least 50 percent of the shells of each packer or processor at the current market price, not to exceed 5¢ per bushel, and amendment of the oyster inspection taxes to provide a tax of 5¢ per bushel on all oysters processed so as to finance the purchase of shells.

2) A program of growing seed oysters on an ascending scale, beginning with the planting, in the spring of 1949, of a minimum of one million bushels of shells in areas having a good record of spat setting intensity.

3) A program of reseeding tributary and Bay oyster bars to the greatest extent possible with the seed oysters that can be raised and with the funds available.

4) The appropriation of sufficient funds to carry out the above recommendations through the taxation of the industry supplemented by an appropriation from general funds.

5) Stricter law enforcement to require sound policies of management of the bars.

6) Encouragement of private oyster farming operations by licensed watermen.

7) An effort should be made to integrate the industry and to get support for a program of rehabilitation by providing for the election of State and county committees of watermen, packers and planters, patterned on the committees provided in the Soil Conservation Districts Law and the Forest Conservancy Districts Act.

An analysis of the oyster problem appears as Appendix III. This report demonstrates the time, expense and difficulties involved in increasing oyster production. *The Commission believes that any program of rehabilitation to succeed must have the support and cooperation of the industry. We are undertaking to secure such agreement to the extent possible and will submit a more detailed plan for rehabilitation as a result of further efforts toward collaboration with the industry.*

As a first step in placing the State in a favorable position to undertake any rehabilitation program we have previously submitted an interim report printed herewith as Appendix IV. This report recommends the acquisition of shells during the current oyster season to the extent of at least a million bushels. We understand that this recommendation has been accepted and is being carried out.

Recommendations on Law Enforcement

1. The Commission appointed a Committee on Law Enforcement which has submitted a thoughtful report (Appendix VI). The recommendations of the committee call for a reorganization of the present system of law enforcement with respect to tidewater fisheries. The Commission feels that the recommendations of the committee are worthy of study by a special commission. If, after further experience along the line of the committee's report, improvements in law enforcement do not take place, the special commission should be charged with a study of practical alternatives such as new measures under the present system or transfer to the State Police.

2. It is further recommended that the equity courts be given power to restrain violation of the laws dealing with the subject of tidewater conservation, and,

3. That a system of licensing be instituted for all persons engaged in taking, transporting, or processing of seafood, and that such license be subject to suspension or revocation after an appropriate hearing by the Board of Natural Resources, with the right of appeal to the courts.

Recommendations On Chesapeake-Potomac Study Commission Report

We recommend the implementation of the recommendations respecting crabs and migratory fish contained in the Chesapeake-Potomac Study Commission report dated January 7, 1948.

The Commission feels that these problems should be solved by the authorities of Maryland and Virginia through enabling legislation to be passed by the legislatures of both States at their respective next general sessions. In the event that agreement by the two States cannot be thus reached, then in view of the urgency of the problems, the Commission recommends that the authorities of Maryland forthwith bring the present critical situation to the

attention of the Congress of the United States with the request that it undertake the regulation of the free-swimming fish and crabs in the Chesapeake Bay and its tributaries in both Maryland and Virginia.

Recommendation On Chesapeake Bay Oceanographical Survey

Maryland and Virginia, in cooperation with the Office of Naval Research, and with the urgent need for detailed knowledge of the physical and biological oceanography of Chesapeake Bay and its tributaries in view, have agreed upon a long range plan of studies and provided funds for its initiation.

We recommend that the plan receive the continuing and consistent support of Maryland and that the Board of Natural Resources review from time to time the progress of the plan and offer suggestions.

Recommendations On Soil Conservation

Recognizing the basic need to conserve our soils, and approving the efforts already directed to this end, the Commission recommends that the State give every encouragement to the speeding up of the State program. It further recommends that a copy of our committee's report on soils be sent to Maryland's Senators and Representatives in Congress with the request that they encourage the advancement of the program of the Soil Conservation Service.

Recommendations On Water Resources

The present State laws governing the appropriation and use of Maryland's water resources appear to be adequate for protecting the public interest in these valuable assets, while the current investigations of the State's surface and underground waters will eventually provide it with the necessary information for their intelligent and equable administration.

In view of the fact that Maryland's consumption of water has for many years been increasing at a much faster rate than its growth in population, adequate steps must be taken to assure the proper conservation and utilization of this essential natural resource. Since any program of water conservation must be based upon an accurate knowledge of the magnitude and extent of the State's surface and underground waters, the Commission recommends:

1) The prompt completion of the stream gaging program as outlined in the Six-Year Conservation Program of the Board of Natural Resources.

2) The immediate inauguration of a comprehensive study of the underground waters of the Eastern Shore.

Recommendations On Forest Resources

Maryland is suffering an annual loss of many millions of dollars from its extensive areas of understocked forests and idle submarginal lands. Considering the favorable growing conditions existing in many parts of the State and the large potential demand for lumber and other wood products, the practice of intensive forestry in Maryland should become an increasingly important factor in the State's economic structure. In order that the State might capitalize more fully upon its many natural advantages in this field, the Commission recommends:

1) The immediate establishment of Forest Conservency Districts in the several counties in which such organizations are not now in operation.

2) The intensification of the present program for encouraging private owners to adopt better management practices on their forest properties.

3) The early inauguration of a large-scale program of tree planting, so that at least half of the State's estimated 400,000 acres of privately owned submarginal land can be reforested within a period of 20 years.

4) That such program be based primarily upon securing the cooperation of the landowners in planting the trees or paying for the cost of planting, with the

State supplying without charge both the necessary technical assistance and the required number of seedling trees.

5) The appropriation of $105,000 to cover the estimated cost of the first year's operation of the projected tree-planting program and $65,000 for the second year, and that such funds be specifically earmarked for reforestation.

6) A sizeable expansion in the annual output of the State nursery in order to meet the needs of the planting program, as well as other demands for tree stock.

Respectfully submitted,

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ISAIAH BOWMAN, *Chairman.*

APPENDIX I

COPY OF THE RESOLUTION AUTHORIZING THE APPOINTMENT OF THE COMMISSION ON CONSERVATION OF NATURAL RESOURCES

LAWS OF MARYLAND, EXTRAORDINARY SESSION, 1948

JOINT RESOLUTION

No. 3

(SENATE JOINT RESOLUTION No. 3)

Joint Resolution requesting and directing the Governor to appoint a Commission to make a study of the laws of this State relating to the conservation of natural resources, with particular reference to the Department of Tidewater Fisheries, and to submit recommendations to the Governor on or before December 1, 1948.

WHEREAS, Chapter 508 of the Acts of 1941 created a State agency known as the Board of Natural Resources, which was authorized and directed to coordinate the activities of the several State Departments concerned with conservation of natural resources including the Department of Tidewater Fisheries and further providing that the Chairman of the Commission of Tidewater Fisheries shall be the Chairman of the Board of Natural Resources; and

WHEREAS, the Department of Tidewater Fisheries has supervisory power and control over natural resources of this State within the bounds of tidewaters; and

WHEREAS, development in the recent functioning of the Commission on Tidewater Fisheries are indicative of a probable weakness in the structure of the Commission as presently organized; and

WHEREAS, these developments of recent months have reached a stage which has undermined public confidence in the operations of the Commission; and

WHEREAS, the Commission on Tidewater Fisheries is the only agency dealing with the conservation of natural resources that is limited to a membership of three, and for which salaried remuneration is provided; and

WHEREAS, it is desirable that a further study be made of the conservation of natural resources within the State of Maryland and with particular reference to the relationship of the Department of Tidewater Fisheries to the Board of Natural Resources; now therefore, be it

Resolved, That the Governor be and he hereby is authorized and directed to appoint, on or before July 1, 1948, a Commission to be known as the Commission on Conservation of Natural Resources, said Commission to be composed of not to exceed nine residents and citizens of the State of Maryland; and be it further

Resolved, That said Commission on the Conservation of Natural Resources be and hereby is authorized and directed to make a study of the laws of this State relating to the conservation of natural resources with particular reference to the Department of Tidewater Fisheries, its powers, duties and obligations as they relate to the conservation program of the State, and to recommend such changes in the Commission on Tidewater Fisheries and its relationship to the Board of Natural Resources as may be necessary to make said department a more useful and efficient branch of the State government, and to submit said recommendations to the Governor on or before December 1, 1948; and be it further

Resolved, That the Governor and Board of Public Works may and are hereby authorized and directed to make available to said Commission from the general emergency fund further appropriation for the fiscal year 1949 sufficient to pay secretarial, stenographic, mailing, telephone, investigation and related incidental expenses that may be incurred by the Commission in the performance of its functions and duties herein set forth.

Approved June 1, 1948.

APPENDIX II

Report of the Committee on Administrative Organization

The committee found rather wide differences of opinion as to what should be done in order to improve the administration of the State's conservation program. Since everyone consulted seemed to agree that substantial progress had been made during recent years in coordinating Maryland's highly diversified conservation activities, the committee concluded that it would be more advantageous to maintain the existing structure with modifications than to adopt an entirely new type of administrative pattern at this time.

Board of Natural Resources:

The Board of Natural Resources appears to be a soundly conceived agency to coordinate the State's conservation activities. It is believed, however, that the Board can and should be strengthened.

The chairmen of the five conservation commissions have never been included on the membership of the Board, either in place of, or in association with, the departmental directors. This has been the subject of a certain amount of criticism. The practical effect of this omission has been, in part, overcome by the Board's long established policy of inviting the commission chairmen to participate in its meetings. Although this practice has been helpful, the committee is of the opinion that further benefits would result if the chairmen were given full membership on the Board along with the departmental directors. The committee believes that this would assure fuller cooperation among the several conservation agencies, and should also increase the prestige of the Board and widen its outlook.

We conclude that the size of the Board should not exceed fifteen members. The addition of the commission chairmen will require another change in its membership. Accepting the desirability of retaining the departmental directors as members of the Board, the number of public representatives should be reduced from eight to five.

A difference of opinion exists in regard to the powers and duties that should be delegated to the Board of Natural

Resources. The principal criticism of the present arrangement is that the Board does not have the authority to determine policies and to enforce its decisions. The Board was originally established as an advisory and coordinating body, and was not given specific regulatory powers over the work of the individual departments, although the Legislature in 1943 made certain acts of the Department of Tidewater Fisheries subject to the approval of the Board.

We believe that there are certain areas in which the functions of the Board of Natural Resources should be extended so that it would have the necessary authority to act in the public interest. It should be the duty of the Board to approve the budgets of the different conservation agencies before they are submitted to the Governor and Budget Director, and the Board should have the responsibility of settling any departmental disputes, the solution of which is not covered by law. The Board also should be required to formulate general policies which would further coordinate the administration of the State's conservation laws, and should be permitted to review the discretionary acts of the separate departments.

The present method of designating the chairman of the Board of Natural Resources is not in accordance with the best interests of the State. To have the chairman of the Commission of Tidewater Fisheries also serve as chairman of the Board of Natural Resources may have been satisfactory up to a certain point, but greater long-run advantages would be obtained if the chairmanship of the Board were divorced from that of any given department. It is therefore recommended that the Governor be empowered to appoint the chairman from one of the five public members of the Board.

The Board should appoint a director to provide leadership in the handling of the State's conservation problems. This director would be a full-time State official. He should be paid a sufficiently high salary to attract a man of broad experience. The director should serve as an ex officio member of the five commissions which head the State's five conservation departments so as to become thoroughly familiar with their operations.

Department of Tidewater Fisheries

When the State's conservation activities were reorganized in 1941, no change was made in the administrative setup of the Commission of Tidewater Fisheries. Its structure was, and still is, somewhat different from that of the other conservation agencies, being composed of three members who are appointed by the Governor with the advice and consent of the Senate. Not more than two of the appointees can be members of the same political party. The commissioners receive a salary for their services, and in the past have exercised both policy-making and administrative functions.

The handling of these two dissimilar functions at the commission level is believed to have been the principal cause of the recent controversy in that department. The committee understands that the Commission has since made an effort to separate its policy activities from those of administration, and that a director or administrator has been appointed. It is considered essential that the separation of managerial and administrative functions from policy determinations be completely eliminated by providing by law for a full-time director to conduct the department's operations from day to day.

It is recommended that the Commission of Tidewater Fisheries be reorganized into a five-man, non-paid commission. The members should be appointed by the Governor, and they should be empowered to select their own chairman, as in the case of the State's other four conservation commissions. Confirmation by the Senate is not required in the case of the other departmental commissions, and we do not believe that such a provision with respect to the Commission of Tidewater Fisheries is desirable.

APPENDIX III

Report on the Oyster Problem

The purpose of this analysis is to define briefly the nature of the oyster problem in order to provide a background for the formulation of a long range program of rehabilitation.

1. Maryland's Potential Wealth In Oysters

The harvesting of oysters on a large scale began in Maryland about 1840. In that year the yield was about 710,000 bushels. The annual catch increased practically each year and reached peaks of 14,000,000 bushels in the season of 1874-75 and 15,000,000 bushels in the season of 1884-85. The average annual catch during the period from 1870 to 1890 was approximately 12,250,000 bushels. Since 1885 there has been a fairly continuous decline in production. During the past several years production has averaged about 2,500,000 bushels. It dropped further to 2,100,000 bushels in the season of 1947-48. The quality of Maryland oysters has likewise steadily declined to a point where there are few raw-bar oysters produced in this State.

The production of oysters in the Chesapeake Bay, as distinguished from the tributaries, has practically ceased. Only 100,000 bushels were harvested from the Bay during the season of 1947-48.

The potential capacity of the Bay to produce oysters remains stupendous. As a result of a survey during the period of 1906-12, approximately 80,000 acres were classified as natural bars and retained under State jurisdiction because the natural growth of oysters on those bars was sufficiently abundant to support public fishing. Today these 80,000 acres are reported to be almost totally barren. Many acres probably have been destroyed for oyster purposes by siltation, changes in water conditions, etc., but it should be possible to rehabilitate a substantial portion of these 80,000 acres by an intensive planting program sustained over a period of many years. If the Bay bars were properly replanted with shells and seed, there is every reason to believe that the production of oysters in the Bay could be restored to 12,000,000 bushels a year instead of the 100,000 bushels harvested last year.

The annual loss in income and wealth to the people of Maryland is obvious. At $2.00 a bushel, the annual loss from the unproductivity of the Bay amounts to $24,000,000.

The production of oysters in the tributaries has declined but not to the point where it has practically ceased, as is the case in the Bay. The taking of oysters in the tributaries has been restricted for the most part to tonging, which has not been so destructive of the bottoms as dredging in the Bay. The Bay bars have been stripped bare of shells and brood stock essential for reproduction of the species. Many tributary bars have suffered the same fate, but a sizeable number remain in production. A modest State program of planting shells and young oysters or seed has helped to preserve these bars in the tributaries. Aside from 350,000 bushels grown by private planters, about 1,650,000 bushels were harvested from bars in the tributaries during the season of 1947-48. This rate of annual production could be increased many fold if the unproductive bottoms in the tributaries were planted with shells and seed.

It may safely be said that the tidewater people of Maryland are losing a potential income of at least $30,000,000 a year from their failure to preserve and to cultivate the oyster producing capacity of the Bay and its tributaries. The Department of Tidewater Fisheries in a report dated November 2, 1943, has stated that Maryland should produce annually 25,000,000 bushels. With such a figure as the potential, the annual loss in income at $2.00 a bushel is $46,000,000 a year.

2. The Oyster Industry In Maryland

Oysters as a natural resource provide a source of livelihood for more than 10,000 citizens of Maryland. The annual income to these people at the present rate of production is approximately $5,000,000. If advantage were taken of the potential value of oysters as a resource by restoring production to former peak levels or beyond, the industry would provide not only a higher income to the 10,000 people engaged in it but would also furnish a source of livelihood for a far greater number of people. The real importance of oysters to Maryland is the employment and income which the resource offers to residents of the State, and the potential employment and income are far greater than the actual.

Persons engaged in the industry may be classified into six groups: (1) tongers, (2) dredgers, (3) planters, (4) buyers, (5) packers and (6) shuckers and packing house workers. Except for the packing house workers, most persons in the industry are independent operators each of whom is as independent in fact as in name. There are factions within each group. Strong differences of opinion divide the groups and factions. The situation is further complicated by the fact that many persons are in two or more groups or two or more factions.

Tongers are the watermen who catch oysters with tongs from the tributaries or county waters, as distinguished from the Bay. There were 3783 persons licensed as tongers during the oyster season of 1947-48. Free oyster fishing on public rocks is an important source of livelihood for these people, but not the sole source since tongers also fish, crab or farm during the off-season. Some tongers also farm oysters on a small scale.

The number of tongers has decreased as the supply of oysters has declined. In 1885 there were approximately 9500 tongers and in 1906 there were 6559. If production were increased on public rocks, there would undoubtedly be many more tongers than the 3783 licensed last year. This fact is demonstrated by the large turn-over in tongers each year. A comparison of tongers licensed for the oyster seasons of 1946-47 and 1947-48 shows that 1403 of those licensed in 1946-47 failed to renew their licenses the following year and that there were 1339 new licensees for the latter year. This represents a turn-over of about 35%. There undoubtedly would not be this turn-over and a large number of tongers would renew their licenses each year if there were a better supply of oysters for these men.

The dredgers are divided into Bay dredgers and tributary dredgers. The Bay dredgers numbered 955 boats (at least 5730 men) in 1885, 626 boats (at least 3756 men) in 1910, but only 12 boats (72 men) during the current season. The Bay dredger is an American who has practically vanished because in plying his trade he took oysters faster than they could reproduce and scraped the bars clean of brood stock and shells essential for reproduction.

Dredging is permitted in Dorchester and Talbot Counties in certain waters of the Choptank River and in Somerset

County in Tangier Sound. Dredging or scraping have been permitted in these Counties for many years. The peak year for these operations was 1891-92 when there were 640 licenses issued for Somerset County, 582 for Dorchester County and 78 for Talbot County or a total of 1300 licenses representing at least 6500 men. A good number of these licensees were probably also tongers. Today there are 85 boats, employing about 510 men licensed to dredge in these Counties.

In addition to tongers and dredgers who are dependent on free fishing on public rocks, there is an unknown number of planters who are engaged in private farming of oysters. There are 1024 lessees of oyster bottom, but it is not known how many of these are actually growing oysters. Certainly not more than 500 are planters. Most of the planting in this State is done by 33 persons who are also oyster packers. These 33 together produce about 350,000 bushels a year, or 1/6th of the State's output. There is some production by other planters in addition to these 33, and about 158 lessees of bottom are licensed tongers. It is known that some tongers plant oysters on a small scale.

The fourth group in the industry is the buyer, commonly known as "buy boats." Today many buyers operate from trucks. Some buy boats are employed by various packers; while others are independent operators. A buyer purchases oysters, usually on the bar, from tongers or dredgers and delivers them to the packer by whom he is employed or, in the case of an independent buyer, sells them to a packer. Since buy boats have never been licensed, there is no accurate figure on their number. It is estimated that there are today 120 buy boats and 65 buyers operating from trucks.

Practically all of the oysters produced in Maryland are processed, shipped and distributed by packers. Even under peak production, Maryland would not be a large producer of raw bar oysters because of the low salt content of the water. Such raw bar oysters as the State did and would produce are not being grown today; hence few Maryland oysters are sold in the shell. The packer, therefore, is an indespensable part of the industry. There were 113 licensed packers during the season of 1947-48.

The 80 packers who are not planters are wholly dependent for their oysters upon tongers and dredgers engaged

in free fishing upon public rocks or upon such oysters as they can buy in New York, New Jersey, Delaware and Virginia. The 33 packers who are planters have as an additional source of supply the 350,000 bushels grown by them or by other lessees who are usually financed by them. The packers are now processing about 1,650,000 bushels a year from Maryland's public rocks, about 350,000 bushels of privately grown oysters and 500,000 bushels from out of the State.

The fifth group in the industry is the shucker and packing house worker, who number about 3,000. About half of these are women.

The industry is highly competitive among the tongers, dredgers, planters, buyers and packers. The competition is both among these five groups and within them. This competition is sharpened by the scarcity of oysters.

The industry is singularly disorganized, which fact makes it difficult if not impossible to obtain a semblance of agreement on any of the problems which beset it. This disunity has its source in the independence of the waterman, who in this regard is akin to the farmer. Disagreement is heightened by the competition and scarcity of oysters, which factors have aroused suspicion, prejudice, fear and related passions.

Nevertheless, the tonger, the dredger, the planter, the buyer, the packer and the packing house worker are an important component of Maryland's tidewater communities. Their well being contributes to the well being of Maryland tidewater counties. Oysters are an extremely important source of livelihood for these people. Should the oyster disappear, the tidewater communities and its people would suffer materially. On the other hand, if the value of the annual harvest of oysters were to be $24,000,000 instead of the present $5,000,000, the tidewater counties would prosper not only to their own benefit but to the advantage of the whole State.

3. Conflicts Within The Oyster Industry

In the consideration of any program to increase oyster production, it is necessary to take into account the many conflicts of interest that exist among groups and factions within the industry. Briefly these conflicts and some of the reasons for them are:

(a) *tonger vs. tonger*

The 3783 tongers are localized in their operations to waters of their respective counties and to bars within the vicinity of the communities in which they live. Extreme rivalries sometimes exist among communities and between counties. For example, in the planting of shells or seed by the State, the tongers of one county compete against the tongers of other counties for preference, and tongers in one part of a county try to out-do the tongers in another section of the same county. The fixing of the boundary line between counties to prescribe the bars which may be tonged by the residents of each county can lead to a violent and insoluble dispute.

Tongers are not concerned with the over-all production of oysters by the State as a whole but are interested only in the bars which they personally work. Each tonger wants the State to maintain the bars nearest to his home and easiest to work since those bars are vital to his immediate livelihood. Tongers naturally will oppose any program to increase production which might adversely affect their present income, which since the beginning of the War has been higher than at any time in history. For that reason, many tongers undoubtedly do not want production increased for fear that it would bring competition and lower prices. It is improbable that the 3783 tongers earning a livelihood today from public bars in the tributaries are interested in the desirability from the point of view of the tidewater counties and the State of increasing the supply of oysters so as to provide a livelihood for an additional 6,000 tongers, as in 1885.

The scarcity and high price of oysters have intensified the competition between tongers and made it difficult to enforce sound management of the bars. The tongers illegally take undersized oysters and brood stock placed on seed areas because there are not sufficient mature oysters. They also dredge and handscrape in areas closed to those operations. These undesirable practices are not discouraged by packers because they are equally pinched by the scarcity. The tongers must therefore be expected to resist observance of the cultural practices essential to any program to increase production, such as closing seed areas, prohibiting the catching of brood stock and enforcing the cull law.

With each tonger an independent operator like a small farmer and with their interests in local bars varying from community to community and county to county, it is most difficult to obtain agreement amongst them on the problems which beset the industry or on a program to increase production. There is an association to which perhaps 15% of the tongers are members. There are several local protective associations of tongers, but at least 85% are not organized into any group through which they can be consulted.

(b) *tonger vs. dredger*

The tonger and the dredger worked together in comparative peace for many years. As long as there were sufficient oysters in the tributaries and in the Bay to support each in their respective operations, there was no problem except occasional encroachment upon each other's domains. With the Bay almost completely barren, the 12 remaining Bay dredgers are naturally searching for a livelihood. That is the reason for the recent attempt of the "big boats", Bay dredgers, to get licenses to dredge in Tangier Sound, which has traditionally been reserved for county dredgers.

In any rehabilitation program, there is a natural conflict between the dredger and the tonger. The former desires the restoration of Bay bars from which he derived his livelihood, while the latter wants any efforts to increase production to be spent on tributary bars. Until there is a sufficient supply of mature oysters, the dredger like the tonger, must be expected to resist the observance of the cultural practices essential to any program to increase production, such as prohibiting dredging in certain areas, closing seed areas, prohibiting catching brood stock and enforcing the cull law.

(c) *tonger and dredger vs. planter*

The opposition of the tonger and the dredger to the planter—"leasing"— is fundamental and complex. Free fishing is regarded by the watermen as their birthright. The oyster is looked upon as a God-given natural resource which is not subject to private ownership while on the bottom. Any restriction upon free fishing by leasing bottoms for private operations is considered a violation of natural rights akin to despoiling the four freedoms. Watermen are certain that any bottom which produces oysters

under private cultivation would have reseeded itself to their benefit had it been retained as a part of the public domain. This inherent antagonism to leasing is intensified by fear of competition from privately grown oysters, which competition if unrestrained would undoubtedly be ruinous to free fishing.

This opposition to private farming is further increased by the fact that the 33 most successful private planters are packers some of whom are not entirely sympathetic or cooperative with the watermen. Only a few tongers and dredgers hold leases, and the number who do has decreased in recent years as seed has become more scarce and more expensive. Watermen are opposed to any extension of leasing for fear that it will lead to increasing the holdings of the 33 planter-packers and the concentration of the industry in the hands of a few large operators, which has certainly been the history of the industry in other states.

The successful planter desires unrestrained leasing. They want as much bottom as they can plant and desire the lifting of all restrictions such as seasons, culling and limitations on dredging. If these concessions were made to the planter, privately grown oysters would enjoy great competitive advantages over oysters taken from public rocks, and for that reason watermen can be expected to oppose such proposals.

The watermen desire a prohibition against private farming by any but licensed tongers or dredgers. With such a prohibition in the law, it is believed that a majority would not oppose the leasing of small barren tracts to their own number. It is probable that watermen would favor State aid comparable to the agricultural extension service to tongers and dredgers engaged in private oyster farming.

(d) *buyers*

There is extreme competition between buyers in their efforts to purchase oysters from tongers and dredgers. This competition is not limited to prices. The scarcity of oysters has resulted in buyers using any trick or favor to obtain oysters. Naturally there is considerable antagonism between independent buyers and buyers who are employed by a particular packer. A further conflict in interest between the buyers and the packers is obvious, with the former trying to obtain the highest price and the latter endeavoring to hold the line.

(e) *tonger and dredger vs. packer*

There is a traditional seller-buyer rivalry between the tonger-dredger groups and the packers. The former are dependent almost entirely on the latter for the sale of their oysters and regard the successful packer as making money at the watermen's expense. The scarcity of oysters has intensified the competition between packers and driven up the price of oysters, with the result that the packers feel that they are being overcharged by the tongers and dredgers. The packers are subject to price competition on their finished product from other states and are therefore extremely pinched by the high price for oysters in this State. The packers regard the tongers, dredgers, and buyers as obtaining all the profit at the expense of the packers.

The leasing controversy enters into the conflict between watermen and packers because some packers hold leases and are successful farmers. Some watermen believe that all packers desire unrestricted leasing so as to take over the production of oysters to the exclusion of tongers and dredgers.

(f) *planter vs. packer*

There is a conflict between the planter and the packer because the 33 most successful planters are packers. These 33 enjoy a competitive advantage over other packers which has produced considerable antagonism. The planter-packer grows some quantity of oysters for a price less than that which has to be paid for oysters from natural bars. In this way the planter-packer is able to subsidize his processing of publicly grown oysters. The planter-packer also is in a position to buy oysters when they are cheapest, hold them on his leased bottom and process them when the market is highest. This ability of the planter-packer to resist the high prices for public rock oysters naturally causes friction not only with other packers but with tongers, dredgers and buyers. This competitive advantage would be increased if leasing by planter-packers were liberalized, which explains the packer opposition to private oyster farming.

The unfavorable competitive position of the packer who is not a planter can not be attributed entirely to the packer's lack of initiative or enterprise. The present lease law pre-

vents these packers from obtaining desirable bottoms for planting, which they undoubtedly would acquire if it were possible to do so. Some may not have the necessary capital.

The net result is that there is not only the expected competitive rivalry between planters and packers, but also a bitter antagonism due to the competitive advantage enjoyed by planters who are packers.

(g) *packer vs. packer*

The competition amongst packers is that found between processors in any industry which is highly competitive. The conflict is intensified by the scarcity of raw materials, i.e., oysters. As a result, packers tend to be fearful, suspicious and jealous of each other but should support any program to increase production which accords equal treatment to them all.

These multitudinous conflicts in interests make the formulation of a program to increase oyster production extremely difficult and the carrying out of a program even more so.

4. The Need for Oyster Farming

Recurrent throughout the history of oyster production in the world may be found the problem of oyster supplies diminishing and efforts to do something about it. Suggestions and programs in several languages have resulted from time to time, but in spite of actions of more or less positive nature, today's world supply is still declining. Wherever and whenever man has taken oysters on a commercial basis, the oyster population has been unable to maintain itself. The decline has not occurred simultaneously in all oyster producing localities, but in each place in regular sequence, varying in time only, production in every oyster growing area has been reduced.

The reason for the decline in oyster production in Maryland was well stated by the Tidewater Fisheries Commission in its report to the legislature in 1947:

> "... this decline has been due to a too intensive oyster fishery. It has been hastened and made complete by the inherently destructive nature of the dredge when operated continuously on an oyster bar where maintenance of production is dependent upon natural reproduction."

In some places in the world, oysters have passed completely out of existence; in others after bars reached a certain state of unproductivity, oyster farming has been adopted and production restored in some measure. A long term increase in the supply of oysters has been realized only in those places where an intensive and planned cultivation has been substituted for reliance upon natural reproduction and unrestrained fishing.

The cultivation of oysters dates back to at least the time of Caesar. It is known that the Romans grew oysters in tanks and pools as a luxury food. Since these early days, the cultivation of oysters has been undertaken successfully in most parts of the world. Oyster farming is developed to a point where certain methods and practices are well known.

In brief, oysters are cultivated by the planting of a cultch, a hard clean surfaced object, in an area where there is a high rate of production of young oysters. The young oysters, after a free swimming period of about 14 days, sink to the bottom and attach themselves to this cultch. An area used for obtaining a catch of these young oysters is commonly known as a seed area. A good seed area should produce a catch of young oysters each year.

The cultch is planted in the spring of each year shortly before the mature oysters spawn to produce the young oysters. In the spring of the following year, the cultch to which are attached young oysters, known as seed, is transplanted from the seed area to a growing bar or area in which there are better natural conditions for growth and development of mature oysters. After transplanting the seed in the second year, the seed area is again planted with cultch to yield a harvest of seed for the following year.

Seed or young oysters transplanted to a growing bar normally mature and are ready for harvest within three years. Thus, a complete cycle of oyster cultivation requires, on the average, four years.

Oyster shells are a vital factor in the farming of oysters because no satisfactory substitute as a cultch for producing seed has been found. Therefore, the best farming practice, and the only one that has proved commercially successful, is to plant each spring on seed areas the shells of the oysters harvested during the preceding season.

A bushel of shells well planted in a good seed area will produce the following year about three-quarters of a bushel of seed or young oysters having a count of from 600 to 1,000 oysters to a bushel. The higher the count of young oysters to a bushel, the better the quality of the seed.

About 3,000 bushels of shells are required to plant one acre of seed area. This should yield the following year approximately 2,250 bushels of seed. We note that this seed will yield from 2,250 to 6,750 bushels of mature oysters, the yield depending upon the quality of the seed, growing conditions and farming practices.

The amount of seed that may be planted on a growing bar depends upon the seed available and the area to be farmed. Generally speaking, seed is planted in quantities up to 500 bushels an acre.

The Tidewater Fisheries Commission in its farming experience can show only one bushel of mature oysters from each bushel of seed transplated and allowed to grow to maturity. Since this record of the Commission is based on the collection of taxes, the actual experience may have been better. With good farming practices, two bushels of mature oysters can be harvested from each bushel of seed, and with the best farming techniques, three bushels of mature oysters can be harvested from each bushel of seed.

These oyster farming practices are essential to produce oysters on a scale that will support commercial fishing. The United States Fish and Wildlife Service estimates that today at least 60% of the oysters produced each year in the United States is grown through farming and the remaining 40% through natural reproduction.

In all of the other important oyster producing states (Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Virginia, Louisiana, Texas, Washington, California, Oregon) natural reproduction has failed to sustain commercial fishing and production is dependent upon the cultivation of oysters by private citizens through planting seed on leased or owned bottoms. In New Jersey and Louisiana, and to a lesser extent in Virginia, the production of seed is a public operation conducted by the State. As will be described more fully hereinafter, about one-third of the oysters produced in Maryland are through farming of which about one-half is conducted by the State and one-half by private citizens operating on leased bottom.

The State of Maryland and its citizens must undertake an extensive program of oyster farming by the planting of shells on seed areas and the transplanting of seed to growing areas with the process repeated each year on an ever increasingly larger scale. Otherwise there appears to be no possibility of re-establishing Maryland's former oyster production and recovering the State's annual loss in income.

5. Oyster Farming In Maryland

In Maryland oyster farming by private citizens has been discouraged and handicapped throughout the history of the State, and the State has not undertaken a program of public farming on a scale sufficient to obviate the lack of private farming. Nevertheless both public and private operations for growing oysters have existed in the State for a number of years and both have produced some oysters to offset partially the steady decline in natural reproduction.

Private oyster farming began in Maryland under an Act of 1830, which authorized riparian owners to lease one acre. By an Act of 1865, a riparian owner was authorized to lease up to five acres for private cultivation. In 1906 the Haman Oyster Law for encouraging oyster farming was adopted. It authorized any private citizen, whether a riparian owner or not, to lease up to 30 acres in the tributaries and up to 100 acres in the Bay. In 1912, the acreage leaseable in the Bay was enlarged to 500 acres and leases in Tangiers Sound were authorized up to 100 acres.

During the period of 1906 and 1912 the State with the aid of the federal government undertook an extensive survey costing $216,000 for the purpose of determining what bottoms contained a sufficient growth of oysters to be classified as natural bars and reserved for public fishing and to make depleted bottoms available for private cultivation. All bottoms classified as natural bars were marked by buoys. A total of 46,894 acres suitable for oyster production were found to be barren and made leaseable for private farming.

The 1906-12 survey was a monumental undertaking to encourage private oyster farming in the State. Through no fault of the able men who directed the survey, the pro-

ject failed to achieve its objective. In 1906, there were 11,000 acres under lease. Today there are 8,454.5 acres leased to 1,024 individuals. Many of these acres are not under cultivation but are being used for bedding or holding oysters pending sale. Nevertheless, it is estimated that the annual production of oysters by persons holding leases is approximately 350,000 bushels, which represents one-sixth of the total production for the State.

Since 1927, the State has engaged in oyster farming operations on a small scale. In that year it began to plant shells and also to transplant naturally grown seed from the head of the Bay where the small oysters did not mature well to better growing areas. Beginning in 1942, a more intensive program of State farming was undertaken. The program adopted by the Tidewater Fisheries Commission in 1942 called for a large State seed growing operation and the transplanting of seed to natural growing bars. The program was to have been self-sustaining under a statutory provision authorizing the collection of a tax from 10¢ to 20¢ a bushel upon all oysters taken from bars farmed by the State through the planting of seed in the tributaries, or through the planting of shells or seed in the Bay. The experience of the State in these public planting operations is of considerable interest. The following table shows the results of operations from 1939 through 1946.

TABLE I

Financial Report of State Oyster Planting Program for the Chesapeake Bay, 1939–1947

Date	*Name of Bar*	*Shells Planted Bushels*	*Seed Planted Bushels*	*Costs*	*Oysters Harvested Bushels*	*Reserved Areas Taxes Collected*
1940	Kent Shore—Broad Cr.	36,158	—	$ 1,988.00		
1941	" "	275,990	—	14,269.00		
1942	" "	90,894	—	5,598.00		
1942	" "	—	6,494	1,104.00		
1942	Brick House	39,423	—	2,209.00		
1945	Gum Thicket	55,373	—	5,169.00		
1946	Kent Shore	—	—	—	31,668	$ 6,333.60
	Totals	497,838	6,494	30,337.00	31,668	6,333.60
1945	Hog Is.	101,632	—	10,339.47		
1945	" "	—	7,600	1,520.00	None	None
	Totals	101,632	7,600	11,859.47		
1943	Love Pt.	50,444	—	3,027.13		
1943	" "	—	6,300	1,260.00		
1944	" "	47,217	—	3,196.00	None	None
1944	" "	—	28,350	7,087.00		
	Totals	97,661	34,650	14,570.13		
1940	C. Pt. Hol.	2,880	—	132.28		
1941	" " "	20,223	—	1,112.00		
1946	" " "		—	—	8,944	1,788.80
	Totals	23,103	—	1,244.28	8,944	1,788.80
1944	Poplar Is.	—	20,260	4,222.00		
1945	" "	—	2,300	575.00		
1946	" "	—	—	—	33,626	6,725.00
	Totals	—	22,560	4,797.00	33,626	6,725.00
1939	Old Rock	231,729	—	12,745.00		
1939	" "		66,061	6,606.10		
1943	" "	46,800	—	3,649.04	81,335	16,267.00
1945	" "	—	—	—	49,492	9,898.00
1946	" "	—	—	—	5,647	1,129.00
	Totals	278,529	66,061	23,000.14	136,474	27,294.00
1939	Plum Pt.	63,364	—	3,264.00	None	None
1943	Parkermoore	22,010	—	1,386.58		
1943	"	—	1,400	280.00	None	None
	Totals	22,010	1,400	1,666.58		
1945	Smiths Is.	45,000	—	4,072.50		
1945	" "	—	1,900	360.00	None	None
	Totals	45,000	1,900	4,432.50		
1940	The Stepps	23,027	—	1,195.00	None	None
	Totals	1,152,164	140,665	$96,366.10	210,712	$42,141.40

Source: Fourth Annual Report, Maryland Board of Natural Resources, 1947.

It may be seen from the table that during the six year period, approximately 210,712 bushels of oysters were harvested as a result of State farming. The bushel yield is figured from the collection of taxes. It is believed that actually a substantially greater number of bushels of oysters was taken, but was unreported for tax purposes. In any event, the cost to the State was $96,366.10 and the taxes recovered in reimbursement of this cost were $42,-141.40. The disappointing showing resulted not only from the failure to collect taxes in full but also from the loss of an estimated million bushels of oysters from the Susquehanna flood waters in the summer of 1945.

In 1947, the State conducted the program of planting shells and seed oysters on a declining scale due to an increased cost of shells and the unavailability of shells which rendered ineffective an increase in the annual appropriation for cultivation from $90,000 to $125,000.

In the spring of 1948, the State harvested and replanted 315,377 bushels of seed oysters and harvested and sold to private planters an additional 39,532 bushels of seed. In addition, the State undertook to plant on seed areas approximately 295,000 bushels of shells and planted on growing bars in the tributaries approximately 127,000 bushels. Practically all of this cultivation by the State is now being undertaken in the tributaries and in 1948 the only planting operation in the Bay was about 24,000 bushels of seed which were placed upon bars off Poplar Island.

In summary, the production of oysters in Maryland through farming is today approximately 700,000 bushels a year of which 350,000 bushels is grown by private citizens and the other 350,000 bushels is grown through public planting operations. Oyster production through farming represents approximately one-third of the total production which was about 2,100,000 bushels for the oyster season of 1947-48.

There are several other important factors to be considered in comparing the annual yield of oysters in Maryland through cultivation with natural production. The 700,000 bushels produced per year through cultivation are harvested from approximately 12,000 acres which is a yield of about 60 bushels per acre. Actually the acreage under cultivation is less than 12,000 because that acreage is figured on the assumption that all of the leased acreage

is in production, which is known not to be the case. The 1,400,000 bushels of oysters produced annually from natural reproduction were harvested from an available 260,000 acres, representing a yield of 6 bushels per acre. In addition, oysters produced through farming are recognized to be of much better quality and size than stock produced by nature without cultivation.

The results achieved by the limited oyster cultivation that has been undertaken in Maryland are a further conclusive demonstration that the only hope for rehabilitation of the oyster industry is by an intensive program of farming. This program could be undertaken either by private citizens or by the State. Whether a public or a private operation, farming on a large scale is essential. This fact has been well known for many years.

6. The Shell and Seed Oyster Problem in Maryland.

Maryland is faced with a serious problem of shortages in shells and seed oysters essential for rehabilitation of the industry by either State or private farming. As previously stated, shells are the only cultch that has proved commercially successful for growing seed, without which it is impossible to begin farming or to restock barren bottom.

At the present rate of production of oysters in Maryland, there are only about two million bushels of shells available each year for replanting. There are three competitive uses to which these shells are being put: (1) chicken feed, (2) country roads and (3) cultch to grow seed oysters. There is a chicken feed industry in Maryland which grinds about 1,000,000 bushels of shells a year. Another 700,000 bushels are being used to fill holes in country roads. The remaining 425,000 bushels are all that the Tidewater Fisheries Commission was able to acquire for replanting during the season of 1947-48 and only 297,000 bushels were planted on seed areas. This should produce about 222,000 bushels of seed for transplanting in the spring of 1949. This rate of seed production is hopelessly inadequate.

Private individuals farming oysters in Maryland at the rate of about 350,000 bushels a year (1/6th of the State's production) are threatened with extinction by the shortage of seed. There are no areas in this State available to

these planters for growing their own seed. At one time they could purchase seed produced in Maryland by nature, and prior to 1947 they could buy all of the seed that they required from Virginia, which state now has an embargo on the exportation of seed. Some planters have been forced to ship the shells from oysters grown by them to Virginia or Delaware, where the shells are planted for seed, which when taken up the following year is returned to Maryland to produce mature oysters.

Private oyster growers could and would produce seed oysters in Maryland if suitable bottoms were made available to them for that purpose. Such individuals are in a better position than the State to grow seed in that they are willing and able to pay the competitive price that must be met to obtain shells on the present tight market. These planters are buying some shells today for shipment out of the State to grow seed.

The State since 1927 has acquired some shells under a 10% shell tax which requires oyster packers to turn over to the Department of Tidewater Fisheries 10% of the shells from oysters shucked by them or the equivalent in money. Beginning with the present oyster season of 1948-49 the shell tax has been increased to 20%. In many areas such as Baltimore, the State has not been equipped to collect the shells and the packers do not have the space to store the shells; so the shell tax has been paid in money. The Department has used funds so obtained and other available moneys to purchase shells in addition to the 10%.

Beginning in 1942 the Tidewater Fisheries Commission began a program to grow seed with the shells which it obtained from the shell tax and with such additional shells as it could purchase. The Department has never had adequate funds to purchase enough shells to grow seed on anything like the State's requirements. With shells becoming more scarce and the price rising, the State's program has been shrinking. The Department harvested 354,809 bushels of seed in the spring of 1948, but shell planting last spring will probably produce only 222,000 bushels of seed in 1949.

In order to increase the production of oysters in Maryland, it is imperative that the State either (1) grow at public expense a sufficient quantity of seed to increase production, or (2) open seed areas to private planters and

permit them to grow seed, or (3) grow seed at public expense to maintain public oyster fishing and also permit private planters to grow seed for private farming.

In order to increase production of oysters to 12,000,000 or 14,000,000 bushels a year, it is necessary to produce from 4,000,000 to 12,000,000 bushels of seed a year. Under experience to date, State farming has realized only one bushel of oysters for each bushel of seed, but private farming in other States has produced three bushels of oysters with each bushel of seed. Thus under the best farming techniques it will require 4,000,000 bushels of seed a year to restore production to former peak levels. To produce seed in such quantities, it is necessary to plant approximately 5,300,000 bushels of shells each year on seed areas.

Any rehabilitation program, no matter how well planned and how well executed, will be a long, slow process because of the shortage of shells and seed. The State is producing only 2,100,000 bushels of shells a year (perhaps 2,600,000 bushels including out-of-state oysters shucked in Maryland), but a minimum of 5,300,000 bushels of shells are needed under the best farming practices and 15,000,000 bushels are needed under mediocre farming techniques.

It is important to begin the process of rehabilitation of the industry at once because as oyster production declines the shortage of shells essential to grow seed becomes ever more acute. It is difficult and perhaps impossible to obtain shells and seed from other states. Maryland will probably find itself in a hopelessly irretrievable position if it does not begin at once a large range, large scale program of planting shells and farming seed, while it still has 2,100,000 to 2,600,000 bushels of shells available each year.

Concluding the discussion of this State's shell and seed problem, it may be said conservatively that Maryland requires *all* of its annual output of shells for seed purposes. The present 20% shell tax is inadequate. The State must appropriate or purchase all of the shells. Once acquired, the shells must be wisely planted to produce the highest annual yield of seed oysters and to reshell those bars which are capable of reproducing themselves.

Such shells as the State is unable to plant each year should be made available to the chicken feed industry, which is the only other justifiable use being made of the

shells. The requirements of that industry are said to be 1,000,000 bushels a year. There is every reason to preserve the chicken feed industry, but it must be done with the State first planting enough shells to restore oyster production; otherwise the chicken feed industry is doomed to extinction along with the oyster industry.

7. The Time Required to Increase Oyster Production.

At best, it will take a long, long time to increase oyster production and even longer to restore production to former peak levels. A rehabilitation program will produce a source of food and livelihood for children and grandchildren of the present generation, many of whom will realize no personal gain. The time factor makes the task more difficult but does not render it any less important.

The Department of Tidewater Fisheries on November 2, 1943 presented to the Board of Natural Resources an Oyster Management Plan which proposed increasing production from 3,000,000 bushels to 10,000,000 bushels over the period from 1944 to 1978. This plan was to be financed by an annual appropriation of public funds of $90,000 and a tax of 20¢ per bushel. The program called for planting shells to grow seed and transplanting seed to grow mature oysters. Beginning with a shell planting of 385,714 bushels on seed areas in 1944, the program called for a gradual increase to 1,000,000 bushels of shells in 1948, to 1,500,000 bushels of shells in 1955, to 2,500,000 bushels in 1959, and so on to 4,875,000 bushels of shells in 1977. An ever increasing quantity of seed oysters to be realized by this shell planting was to be transplanted each year to increase the annual production of mature oysters to about 10,000,000 bushels in 1977.

This 1943 program of the Department of Tidewater Fisheries shows the time required to increase production after thoughtful planning and under favorable conditions. When the plan was put into effect, most unfavorable conditions were encountered. The State was unable to enforce collection of the 20¢ per bushel tax which was to finance the program. Rising prices for shells and seed reduced the effectiveness of such funds as were available. Flood waters in 1945 destroyed probably a million bushels of oysters in the head of the Bay north of Sandy Point.

The State also was not able to enforce the necessary cultural practices such as leaving brood stock on seed areas and permitting oysters to grow to full maturity. The result was that the Department of Tidewater Fisheries abandoned its program in its infancy. Whereas the plan called for planting 1,000,000 bushels of shells on seed areas in 1947, the State actually planted only 295,000 bushels.

In order to increase production of oysters, it is essential to maintain a program over a period of many years. Utilizing all of the 2,000,000 bushels of shells available in the State and under reasonably favorable conditions, a fifteen year program of rehabilitation should increase production by about 3,400,000 bushels, as follows:

	Shells Planted	*Seed Transplanted*	*Harvest*	*Cultivation Cost*
1949-50	2,000,000	225,000	2,000,000	$348,000.
1950-51	2,000,000	1,500,000	2,000,000	730,000.
1951-52	2,000,000	1,500,000	2,000,000	730,000.
1952-53	2,000,000	1,500,000	2,225,000	730,000.
1953-54	2,225,000	1,500,000	3,500,000	762,000.
1954-55	3,500,000	1,669,000	3,500,000	991,000.
1955-56	3,500,000	2,625,000	3,500,000	1.278,000.
1956-57	3,500,000	2,625,000	3,500,000	1,278,000.
1957-58	3,500,000	2,625,000	3,669,000	1,278,000.
1958-59	3,669,000	2,625,000	4,625,000	1,301,000.
1959-60	4,625,000	2,752,000	4,625,000	1,474,000.
1960-61	4,625,000	3,469,000	4,625,000	1,689,000.
1961-62	4,625,000	3,469,000	4,625,000	1,689,000.
1962-63	4,625,000	3,469,000	4,752,000	1,689,000.
1963-64	4,752,000	3,469,000	5,469,000	1,706,000.
1964-65	5,469,000	3,564,000	5,469,000	1,835,000.

The above chart is an ideal. A more realistic estimate of the result that can be hoped for within fifteen years is to increase production by about 1,800,000 bushels to 3,966,000 bushels annually, as follows:

	Shells Planted	*Seed Transplanted*	*Harvest*	*Cultivation Cost*
1949-50	1,000,000	225,000	2,100,000	$196,000.
1950-51	1,000,000	750,000	2,100,000	354,000.
1951-52	1,000,000	750,000	2,100,000	354,000.
1952-53	1,000,000	750,000	2,325,000	354,000.
1953-54	1,325,000	750,000	2,850,000	400,000.
1954-55	1,850,000	995,000	2,850,000	547,000.
1955-56	1,850,000	1,388,000	2,850,000	665,000.
1956-57	1,850,000	1,388,000	2,850,000	665,000.
1957-58	1,850,000	1,388,000	3,095,000	665,000.
1958-59	2,094,750	1,388,000	3,487,500	670,000.
1959-60	2,487,500	1,571,000	3,487,500	810,000.
1960-61	2,487,500	1,866,000	3,487,500	898,000.
1961-62	2,487,500	1,866,000	3,487,500	898,000.
1962-63	2,487,500	1,866,000	3,671,000	898,000.
1963-64	2,671,000	1,866,000	3,966,000	920,700.
1964-65	2,966,000	2,103,000	3,966,000	1,036,200.

8. The Cost of Increasing Oyster Production.

The cost of increasing oyster production to former peak levels of 12,000,000 to 15,000,000 bushels a year is tremendous. The cost of achieving the full estimated potential of 25,000,000 bushels a year would be even more staggering.

The Department of Tidewater Fisheries used as the basis for its November 2, 1943 program an average cost of seed of 25¢ per bushel. Today it is not safe to estimate costs with less than 45¢ per bushel of seed as the basis. In other states the cost of seed far exceeds 45¢ per bushel,

and the cost of seed in Maryland may rise even higher. Nevertheless, it is believed that the cost of seed in Maryland can be stablized at an average price of 45¢ per bushel computed as follows:—not more than 5¢ per bushel to purchase shells, 10¢ per bushel to plant shells and 30¢ per bushel to transplant seed. If the State controls the shells and conducts the seed program, it should be able to avoid higher prices which in other states are due largely to the private sale of seed for what the traffic will bear.

Using 45¢ per bushel of seed as the basis for demonstrating the minimum cost of increasing oyster production, the annual cost of planting 1,000,000 bushels of shells on seed areas and producing 750,000 bushels of seed will be approximately $337,500. Such a program if sustained with success over a period of years should increase production of oysters by 1,000,000 to 2,500,000 bushels, the size of the increase depending on the extent to which sound cultural practices are observed. To further increase production it is necessary to expend a greater amount of money each year.

In order to increase production to 12 to 14 million bushels a year, the cost under the best farming practices will be $1,800,000 a year and under State experience to date, $5,400,000 a year. This is an annual expense which must be incurred each year and not a capital outlay which will yield a return over a period of many years. Assuming the bars restocked, the expenditure of 2 to 5 million dollars for seed must be incurred each year in order to maintain the level of production and avoid depletion all over again.

The program proposed by the Tidewater Fisheries Commission on November 2, 1943 called for an expenditure of $24,653,742 over the period of twenty-five years, an average of about one million dollars a year. This was to increase production by 7,204,500 bushels.

A fifteen year program such as that outlined on page 41, which is a reasonable objective for the state to adopt with such shells as are available, will cost $10,330,900, or an average of $688,727 a year, assuming an average price of seed of 45¢ per bushel.

9. Advantages and Disadvantages of Increasing Production Through State Oyster Farming.

State oyster farming, i. e. a program of State cultivation of the bars and free fishing by the public, has several definite advantages over private farming.

First, it retains under the control of the State a basic and important natural resource. Presumably State control of such a valuable natural resource prevents its destruction by commercial exploitation.

Second, it permits a large number of citizens without the necessary capital for private oyster farming to earn a livelihood by taking oysters. The right to fish remains a public right available to all and does not become a matter of private ownership and exclusion.

Third, the welfare of 4600 tongers, dredgers and buyers and their families who are today dependent on free fishing on public bars will be seriously jeopardized with considerable social dislocation and hardship in the tidewater communities unless the State continues recropping the natural bars on a scale at least sufficient to maintain the present level of production. The welfare of these tidewater citizens is a matter of real importance and benefit to the State. A State oyster farming program on the largest scale economically practicable is necessary to protect the interests of these people.

Fourth, the State seed program is essential not only to reseed public rocks but to furnish licensed watermen with a source of seed for any private farming operations that they may undertake. The areas in the State which have a good record of spat setting intensity and regularity are all under State control. Unless the State properly utilizes these areas to grow seed, there will be no seed for either public or private farming operations. Furthermore, the growing of seed is an extremely expensive operation which a licensed waterman engaged in farming a small tract could not finance. Only by the State making seed available to the licensed tonger or dredger will there be any possibility of such watermen farming small tracts to supplement public rock operations. Such a State seed program is in effect in New Jersey, Virginia and Louisiana.

Several disadvantages of a public operation have been encountered which have prevented State oyster farming from increasing production. It is probable that these same factors will defeat future efforts to restore production merely by State planting of shells and seed.

The annual cost of producing oysters is prohibitive unless that cost is recovered in some way. It is essential to adopt a program of annual recropping of the bars according to the same principles which govern a farmer tilling the soil. As previously shown, the annual cost of producing 12,000,000 to 14,000,000 bushels of oysters will be $1,800,000 to $5,400,000 assuming the price of seed remains 45¢ per bushel. In order to utilize not more than 50% of the State's capacity to grow oysters, it will cost at least $3,000,000 a year. Certainly the State can not be expected to undertake such a large annual expenditure of public funds without some assurance that it will be able to recover this cost.

The State has been spending less than $90,000 a year to grow oysters (except for the past two years for which the appropriation has been $125,000). In addition, it is spending approximately $300,000 a year to enforce the oyster laws which have been adopted to require the observance of sound cultural practices. Taxes from the industry and fines for law violations total about $90,000 a year.

It is believed that the industry could be taxed so as to produce an additional $110,000 so that the total contribution from the industry toward public oyster farming would be approximately $200,000. Any annual expenditure beyond that would probably have to come from general funds. In order to raise sufficient funds from the industry to finance a public operation of from 12,000,000 to 14,000,000 bushels, it would be necessary to levy a tax of about 45¢ per bushel on oysters. It is believed that the State would not be able to collect such a tax since previous efforts to collect a tax of 20¢ a bushel on State grown oysters was a dismal failure. Furthermore, too high a tax would price Maryland oysters out of the market where they must compete with oysters grown in other States.

Other factors besides cost which have defeated public farming operations are:

The State has proved hopelessly incapable of asserting the control necessary to protect oysters as a natural resource from destruction. The present depletion of the public oyster fishery may be compared with what would be the status of the State forests if woodsmen were permitted to cut trees at will. The State has enforced control over its forests, but it has been unable to enforce even the most elementary restrictions upon free fishing for oysters. Maintenance of necessary cultural practices is as essential to a system of State farming as to private farming. It has been found impossible to compel observance of these necessary cultural practices when the State has borne all of the expense of failure. As the number of oysters has declined, competition has increased and enforcement of the required control has become more difficult.

Farming on such a large scale and over such a wide area as the Chesapeake Bay and its tributaries requires greater intimate knowledge of local conditions than State culturists are likely to possess. It is believed that greater success can be achieved in oyster farming through a large number of small individually owned tracts because of the individual operator's experience and knowledge of local conditions and requirements.

There are certain fundamental inefficiencies in a public operation which is not under the economic necessity of supporting and justifying itself. A large State farming program supported by public appropriation and not required or able to earn its cost would be far more inefficient than a number of private farming operations each required to justify its cost.

10. Advantages and Disadvantages of Increasing Production Through Private Oyster Farming

It appears certain that private oyster farming if permitted to operate on a sufficient scale would restore oyster production to former peak levels and probably in excess thereof at no cost to the State. That is probably the principal reason for the vigorous opposition to private farming. The competition from a high rate of private production and the higher quality oyster produced by private farming is greatly feared by practically all persons participating in the present public oyster fishery.

A system of private farming will instill in the industry the incentive and interest to produce. These vital elements are lacking in a State program under which the individual harvests without responsibility for producing.

There is every reason to believe that adequate private funds would be available to produce oysters on a scale of 12,000,000 bushels a year without cost to the State. Oyster farming has been proved a commercially successful operation. In other States private capital has been invested on a sufficient scale to restore production. With Maryland having the best potential oyster producing area in the world, it is expected that the private funds required to put the depleted bottoms in production would be forthcoming.

Under a system of private farming, enforcement of sound cultural practices would no longer be a problem and expense to the State. The grower would adopt those practices by economic necessity and in doing so would undoubtedly adopt better farming practices than the State can hope to enforce. The grower would for the same reason make the best utilization of the bottoms and would undertake to expand the market for oysters as production increased.

While the advantages of private oyster farming as described briefly above are manifold, it must be conceded that there are certain disadvantages. A natural resource becomes a matter of private ownership, and unless safeguards are adopted, ownership becomes concentrated in the hands of a few large interests.

11. Advantages and Disadvantages of Increasing Production Through A Coordinated System of Both State and Private Farming

The advantages of both State and private farming can be obtained for the State and its citizens by a coordinated system whereby both operations are permitted and encouraged. It is believed that the only disadvantage to the State of such a system would be that the oysters produced by State farming might be poorer quality and unable to compete with oysters produced by private farming. This matter could be corrected by persons engaged in free fishing for State grown oysters observing proper cultural techniques. Perhaps the competition of privately grown oysters

would enable the State to enforce much desired controls over public bottoms.

The State should and must remain in the business of growing seed oysters for three compelling reasons: (1) seed is necessary to maintain the natural bars which are still producing, (2) growing seed is an expensive operation which a small private grower cannot finance, and if the State is to encourage such operations, it must be in a position to furnish seed, and (3) until such time as seed is permitted to be grown privately in Maryland, the State is the only available source of seed for small or large farming operations by either the State or private individuals. Furthermore, so long as the State remains the sole source of seed in Maryland, the Tidewater Fisheries Commission must grow seed on a much larger scale for there to be any hope of rehabilitating the industry. The cost of such seed can be recovered to the extent that private farming is encouraged and the seed is sold to private operators.

It is believed that in addition to growing seed, the State should continue to maintain the natural bars which are still producing and should try to rehabilitate barren bottom to the extent that it can do so with available appropriations. This will continue oystering as a source of livelihood to those engaged in free fishing. By increasing the shell and seed program, the production from free fishing can be increased.

There are, however, so many thousands of acres of depleted and barren oyster bottoms that it is impossible for the State to rehabilitate them without annual appropriations of many millions of dollars. There can be no justification for continuing to allow these bottoms to be idle and unproductive.

The suggestion of rehabilitating oyster production by permitting private farming of barren bottom is as old as the depletion problem itself. Ever since oyster production has declined, it has been obvious that private farming would rehabilitate the industry at no cost to the State and that the public expense of attempting to restore production without private farming is prohibitive. During the period of 1906-12 the State and the federal government conducted an ambitious survey of all Bay and tributary bars and charted those which should remain under public opera-

tion and those which should be opened to private farming. The Fourth Report (1912) of the Shell Fish Commission on the results of this survey explained how public fishing can be continued by the State maintaining productive natural bars and private farming operations encouraged to supplement the catch from free fishing:

> "The prejudice against oyster culture of those who depend upon the natural oyster grounds for a livelihood, can only be removed by demonstrating that an industry in planting on the barren bottoms, need in no way interfere or conflict with the existing industry on the natural oyster bars, but that the two industries can be made to thrive independently side by side; that a demand for oysters throughout the Middle West can be easily developed, when the means of supplying it are at hand, such that the price of oysters will not be seriously affected by increasing many fold the output from the Chesapeake, but that the market, when thus enlarged will be more stable than under the present limited supply.
>
> "The interest of men with the necessary ability, energy and capital must be enlisted in the industry, by demonstrating to them that the barren bottoms opened for lease by the State for the purpose of oyster culture are, when rightly managed, a valuable investment; that the present policy of the State to encourage oyster culture is not to be altered, but that it is the determinination of the State to grant every privilege and safeguard essential to the succes of oyster culture not detrimental to the existing industry on the natural bars.
>
> "Time will be required to eliminate the prejudices which now hamper the development of the industry, and to inspire such confidence in it as is necessary to place it upon a satisfactory basis."

In 1910-11 the State produced 3,500,000 bushels, and in the season of 1947-48, production from natural bars was 1,750,000 bushels. In spite of the intensive efforts of many able State officials and private citizens since 1877, little if anything has been accomplished toward solution of the problems that have obstructed the adoption of a system of coordinated public and private farming.

APPENDIX IV

Interim Report on Oysters

September 28, 1948

The Honorable Wm. Preston Lane, Jr.
Governor of Maryland
Annapolis, Maryland

Subject: First Interim Report of the Commission on Conservation of Natural Resources.

Dear Governor Lane:

This letter is an interim report of the Commission appointed by you to study the laws relating to the Conservation of Natural Resources with particular reference to the Department of Tidewater Fisheries.

The Commission is in the process of formulating a long range program for rehabilitation of the oyster industry in Maryland. In due course, the Commission proposes to confer with representatives of the watermen, packers and growers and all other interested groups with a view to obtaining unity of purpose and action when such program is submitted to you and the General Assembly.

Regardless of what form of program may later be submitted and adopted, it is essential that the State of Maryland substantially increase its annual production of seed oysters in order to be in a position to carry out a program of rehabilitation. In the spring of 1948, the Department of Tidewater Fisheries planted approximately 500,000 bushels of oyster shells, of which 300,000 were planted on seed areas. At the same time the Department transplanted approximately 350,000 bushels of seed oysters realized from the planting of shells on seed areas during the spring of 1947. This volume of shell and seed planting is all that the Department of Tidewater Fisheries can undertake with funds presently available to it. This is hopelessly inadequate for any program of rehabilitation which the State may determine to undertake. A greatly expanded supply of seed oysters is the first requirement to increase the annual yield of marketable oysters. There is no adequate source of seed available to the State of Maryland or to its people except such as may be grown on Maryland bottoms. The situation is rendered more acute than here-

tofore because the State of Virginia, which has long been a good source of seed oysters for this State and its people, has placed an embargo upon the exportation of seed grown on its bottoms. Delaware, which produces some seed but not an adequate supply, is expected to follow Virginia in adopting a similar embargo. It is, therefore, strongly recommended by the Commission:

(1) that the Department of Tidewater Fisheries be directed to undertake during the current oyster season the acquisition of a minimum of 1,000,000 bushels of oyster shells and in planting these shells to place at least 700,000 bushels upon seed areas during the spring of 1949. The Department should be urged further to increase these minimum figures for shell planting to the extent that it is possible to do so.

(2) that there be made available to the Department of Tidewater Fisheries during the fiscal year ending June 30, 1949, the sum of $40,000 in addition to present appropriations, with which to carry out the above program.

It is estimated that if the Department does undertake this expanded shell program by planting a minimum of 700,000 bushels of shells on seed areas during the spring of 1949, the harvest of seed oysters would be more than doubled and should be about 550,000 bushels in 1950. This increased planting of shells and seed will have to be continued in subsequent years and may even have to be further increased. As previously stated, there is little possibility of undertaking any program to rehabilitate the oyster industry within the foreseeable future unless the State *begins at once* to provide a source of seed oysters on the minimum scale recommended herein.

In support of the recommendation that an additional $40,000 be made available to the Department of Tidewater Fisheries during the present fiscal year ending June 30, 1949, this Commission notes that the Department requested $250,000 for its shell and seed program in each of the fiscal years of 1948 and 1949, but that only $125,000 was appropriated in the budget for each year. The legislature provided, however, by Chapter 640 of the Acts of 1947 that the Department expend each year for the planting of shells and seed (1) the amount appropriated in the budget, i.e., $125,000, and (2) all monies collected as taxes and fines

under Article 72 and required to be credited by the Comptroller to the Oyster Fund. The Comptroller has refused to make available to the Department of Tidewater Fisheries the monies required to be credited to the Oyster Fund, which monies amount each year to approximately $90,000, on the ground that Chapter 640 is unconstitutional. The constitutionality of this law is arguable, but valid or invalid, it represents a clear expression of legislative direction to increase substantially the shell and seed program.

We hope that the recommendations contained herein meet with your approval.

Respectfully submitted,

ISAIAH BOWMAN, *Chairman.*

APPENDIX V

Report of the Committee on Soils, Waters, and Forests

Soils

Maryland's agricultural soils represent the State's most important natural resource. Its more than 4,000,000 acres of farmland provide the basis for the production of a large volume of agricultural products, which in 1947 brought in a total cash income of over $235,000,000. The importance of the State's agricultural industry is further indicated by the fact that its 41,275 farms in 1945 reported an aggregate investment of some $450,000,000 in farm real estate, equipment, and livestock.

The agricultural activities of Maryland not only furnish a livelihood for around 75,000 family and hired workers but the large purchasing power of the farming population also has an important effect on the economic welfare of the entire State. Besides serving as a valuable market for a wide variety of goods and services, Maryland farms, in turn, provide a convenient source of raw materials for various kinds of industrial establishments, including dairies, grain mills, canneries, meat-packing plants, and numerous others.

There are, therefore, many excellent reasons why all necessary encouragement should be given toward the conservation of the State's soil resources. If properly managed, the soil will remain fertile for an indefinite period; but if neglected, erosion and other destructive agencies will seriously impair its productivity. The history of land utilization in Maryland, as in many other States, reveals that through the long-continued use of improper cultural practices, a large percentage of the arable land has been considerably damaged by erosion. Studies of the U. S. Soil Conservation Service indicate that from one-third to one-half of the original topsoil on the sloping farmlands of Maryland has already been eroded away, and that thousands of acres have actually lost more than three-fourths of their topsoil.

Despite the urgent need for constructive measures to halt the steady impoverishment of agricultural land throughout the country, it was not until very recent years

that practical techniques were developed for enabling the ordinary farm operator to adopt a permanent system of soil conservation. These new methods were first inaugurated on a large scale about 15 years ago by the U. S. Soil Conservation Service, then known as the Soil Erosion Service. The farming practices recommended by this agency are intended to secure the proper care and protection of land while in use so that it will continue to produce satisfactorily.

While the management of farms in accordance with the new agricultural techniques is proving to be an effective means for controlling the erosion problem, it also has the additional advantage of materially increasing crop yields. The increase in the per-acre yields throughout the United States for farms utilizing proper soil practices for two years or more has averaged around 30 per cent. These higher yields are due in large measure to the fact that the cultural methods employed are designed to maintain a greater supply of soil moisture.

The soil conservation activities in Maryland are conducted jointly by the State and the Federal Government. This cooperative arrangement is based upon legislation enacted by Congress in 1935 and a State law passed in 1937. Federal participation is handled through the Soil Conservation Service, a bureau of the U. S. Department of Agriculture.

The Maryland law provides for a State Soil Conservation Committee and for the establishment of local soil districts throughout the State. The State Committee, which is charged with the general supervision of the Maryland program, is composed of the director of the Maryland Agricultural Experiment Station, the director of the Maryland Agricultural Extension Service, the director of the Department of State Forests and Parks, the chairman of the State Board of Agriculture, and the principal administrative officer in Maryland for the U. S. Soil Conservation Service.

Although the soil interests of the State are not represented on the State Board of Natural Resources, the component departments of that agency frequently work in close cooperation with the local soil districts, the State Committee and the Soil Conservation Service. For example, the cooperative working agreement with the Maryland State

Game and Inland Fish Commission, known as the "Cooperative Farm-Game Program," which has for its objective the establishment of game refuges and the providing of natural habitats for game and fish on farms that are adopting soil conservation practices, is proving its success.

During the past several years the Federal government has been appropriating approximately $40,000,000 annually for the support of a national soil program. Generally speaking, the money is distributed on the basis of the number of soil conservation districts which have been established in each State. The average annual allotment per district for the whole country is around $17,000. Maryland is currently receiving $350,000 per year, or slightly more than $15,000 for each of its 23 districts.

There is no provision in the Federal act which requires the individual States to make specific appropriations in order to become eligible for Federal funds. However, all but three States are now making some direct allocation for this work, the amounts varying from as little as $300 per year for Nevada and Wyoming to $250,000 or more for Kentucky, Louisiana, and Oklahoma. With an initial appropriation of $3,750 in 1940, Maryland has gradually increased its contribution to approximately $50,000 for each of the years 1948 and 1949.

The tabulations presented on pages 55 and 56 show the various State appropriations and allocations for the Soil Conservation District Program which were in effect in October 1946 and in September 1948. A comparison of the data given in the two tables discloses that the majority of the States have been increasing their direct allocations to the soil program, although in most instances the additional expenditures have not been very large. As of September 1948, only seven States reported larger appropriations than Maryland.

CURRENT STATE APPROPRIATIONS AND ALLOCATIONS FOR SOIL CONSERVATION DISTRICT PROGRAM[1] OCTOBER 21, 1946

State	ACTUAL: Appropriations and Allocations Period	ACTUAL: Appropriations and Allocations Amount	ESTIMATED FOR: Expenses of State Committee[2] Percent	ESTIMATED FOR: Expenses of State Committee[2] Amount	ESTIMATED FOR: Directly Assisting Districts Percent	ESTIMATED FOR: Directly Assisting Districts Amount
Alabama	10/1/45—9/30/47	$ 14,200	10	$ 1,420	90	$ 12,780
Arizona	7/1/46—6/30/47	6,280	100	6,280	—	—
Arkansas	7/1/45—6/30/47	13,600	—	—	100	13,000
California	7/1/45—0/30/47	17,500	100	17,500	—	—
Colorado	—	—	—	—	—	—
Connecticut	7/1/45—6/30/47	35,000	50	17,500	50	17,500
Delaware	7/1/44—6/30/46	1,000	100	1,000	—	—
Florida	7/1/45—6/30/47	5,230	20.7	1,080	79.3	4,150
Georgia	7/1/46—6/30/47	0,000	50	3,000	50	3,000
Idaho	—	—	—	—	—	—
Illinois	7/1/45—6/30/47	16,330	100	10,330	—	—[3]
Indiana	7/1/46—6/30/47	6,000	100	0,000	—	—
Iowa	7/1/45—6/30/47	24,000	100	24,000	—	—
Kansas	7/1/45—6/30/47	3,000	100	3,000	—	—
Kentucky	7/1/46—0/30/47	30,000	40	12,000	60	18,000
Louisiana	7/1/46—6/30/48	516,746	1.2	6,227	98.8	510,519
Maine	7/1/46—6/30/47	3,000	9.2	276	90.8	2,724
Maryland	7/1/45—6/30/47	29,000	20	5,920	80	23,680
Massachusetts	—	2,500	100	2,500	—	—
Michigan	7/1/45—0/30/47	40,000	40	16,000	60	24,000
Minnesota	7/1/45—0/30/47	19,000	20	3,800	80	15,200
Mississippi	7/1/46—6/30/48	1,500	100	1,500	—	—
Missouri	7/1/46—6/30/47	7,500	100	7,500	—	—
Montana	7/1/45—6/30/47	2,000	80	1,600	20	400
Nebraska	7/1/45—6/30/47	13,774	100	13,774	—	—
Nevada	7/1/45—6/30/47	000	100	600	—	—
New Hampshire	—	—	—	—	—	—
New Jersey	7/1/46—6/30/47	3,525	40	1,410	60	2,115
New Mexico	7/1/46—6/30/47	5,000	50	2,500	50	2,500
New York	4/1/46—3/31/47	6,700	100	6,700	—	—
North Carolina	7/1/46—6/30/47	5,000	—	—	100	5,000
North Dakota	7/1/45—6/30/47	20,390	3	012	97	19,778
Ohio	7/1/45—6/30/47	500	100	500	—	—
Oklahoma	7/1/46—6/30/48	480,000	6.4	30,600	93.6	449,400
Oregon	7/1/45—6/30/47	6,000	53	3,180	47	2,820
Pennsylvania	6/1/45—5/31/47	30,000	—	—[4]	—	—[4]
Puerto Rico	7/1/46—6/30/47	150,000	10	15,000	90	135,000
Rhode Island	7/1/46—6/30/47	27,500	17.5	4,812	82.5	22,688
South Carolina	7/1/46—6/30/47	7,500	—	—	100	7,500
South Dakota	—	—	—	—	—	—
Tennessee	—	—	—	—	—	—
Texas	9/1/45—8/31/47	123,072	44.9	55,259	55.1	67,813
Utah	7/1/45—6/30/47	12,000	25	3,000	75	9,000
Vermont	7/1/45—6/30/47	6,000	22	1,320	78	4,680
Virginia	7/1/46—6/30/48	258,050	10	25,805	90	232,245
Washington	—	—	—	—	—	—
West Virginia	7/1/45—6/30/47	30,000	10	3,000	90	27,000
Wisconsin	7/1/45—6/30/47	40,000	100	40,000	—	—
Wyoming	4/1/45—3/31/47	1,000	100	1,000	—	—
UNITED STATES TOTAL		$2,026,597		$363,505[5]		$1,633,092[5]

[1] Includes only direct appropriations and allocations. While cooperation with soil districts by state and local agencies in their regular course of work is known to be substantial, no reliable basis has been developed for evaluating assistance of such agencies as, Agricultural Extension Services, Wildlife Commissions, Forestry Departments, counties and municipalities.

[2] Committee, Commission, Board, Division or Director.

[3] State constitutional problems in allocation of funds for use by districts.

[4] Not estimated.

[5] Pennsylvania not included.

Source: Soil Conservation Service, Washington, D. C.

CURRENT STATE APPROPRIATIONS AND ALLOCATIONS FOR SOIL CONSERVATION DISTRICT PROGRAM[a] SEPTEMBER, 1948

State	ACTUAL: Appropriations and Allocations Period	ACTUAL: Appropriations and Allocations Amount	ESTIMATED FOR: Expenses of State Committee Percent	ESTIMATED FOR: Expenses of State Committee Amount	ESTIMATED FOR: Directly Assisting Districts[b] Percent	ESTIMATED FOR: Directly Assisting Districts[b] Amount
Alabama	10/1/47—9/30/48	$ 5,000	40	$ 2,000	00	$ 3,000
Arizona	7/1/48—6/30/49	8,000	100	8,000	0	0
Arkansas	7/1/47—6/30/49	28,800	0	0	100	28,800
California	7/1/48—6/30/49	14,237	100	14,237	0	0
Colorado	7/1/47—6/30/49	13,600	100	13,600	0	0
Connecticut	7/1/47—6/30/49	36,805	28.8	10,600	71.2	26,205
Delaware	7/1/47—6/30/49	16,400	8.5	1,400	91.5	15,000
Florida	7/1/47—6/30/49	206,000	3	6,000	97	200,000
Georgia	7/1/47—6/30/49	6,000	0	0	100	6,000
Idaho	—	0	0	0	0	0
Illinois	7/1/47—6/30/40	22,366	100	22,366	0	0
Indiana	7/1/47—6/30/49	12,000	100	12,000	0	0
Iowa	7/1/47—6/30/49	31,600	100	31,600	0	0
Kansas	7/1/47—6/30/49	10,000	100	10,000	0	0
Kentucky	7/1/48—6/30/50	500,000	2	10,000	98	490,000
Louisiana	7/1/48—6/30/50	800,000	0	0	100	800,000
Maine	7/1/48—6/30/49	4,000	6	240	94	3,760
Maryland	7/1/47—6/30/49	98,000	40	39,200	60	58,800
Massachusetts	7/1/48—6/30/49	2,000	100	2,000	0	0
Michigan	7/1/47—6/30/49	58,000	30	17,400	70	40,600
Minnesota	7/1/47—6/30/49	31,500	40	14,490	54	17,010
Mississippi	7/1/48—6/30/50	1,500	100	1,500	0	0
Missouri	7/1/47—6/30/49	18,000	100	18,000	0	0
Montana	7/1/47—6/30/49	2,000	85	1,700	15	300
Nebraska	7/1/47—6/30/49	18,000	100	18,000	0	0
Nevada	7/1/47—6/30/49	600	100	600	0	0
New Hampshire	7/1/47—6/30/49	5,000	20	1,000	80	4,000
New Jersey	7/1/48—6/30/49	3,707	25	927	75	2,780
New Mexico	7/1/47—6/30/49	13,000	50	6,500	50	6,500
New York	4/1/48—3/31/40	900	100	900	0	0
North Carolina	7/1/48—6/30/40	5,000	40	2,000	60	3,000
North Dakota	7/1/47—6/30/49	20,940	5	1,047	95	19,893
Ohio	7/1/47—6/30/49	900	100	900	0	0
Oklahoma	7/1/47—6/30/49	577,184	7.6	43,865	92.4	533,319
Oregon	7/1/47—6/30/49	14,834	80	11,867	20	2,967
Pennsylvania	7/1/47—6/30/49	25,000	100	25,000	0	0
Rhode Island	7/1/48—6/30/49	2,000	50	1,000	50	1,000
South Carolina	7/1/47—6/30/48	5,000	0	0	100	5,000
South Dakota	—	0	0	0	0	0
Tennessee	—	0	0	0	0	0
Texas	9/1/47—8/31/48	99,368	54.7	54,354	45.3	45,014
"	9/1/48—8/31/49	106,368	51.1	54,354	48.9	52,014
Utah	7/1/47—6/30/49	12,000	50	0,000	50	6,000
Vermont	7/1/47—6/30/49	45,000	34	15,000	66	30,000
Virginia	7/1/48—6/30/50	145,640	10	14,564	90	131,076
Washington	4/1/47—4/1/49	20,000	0	0	100	20,000
West Virginia	7/1/47—6/30/49	320,000	2	7,000	98	313,000
Wisconsin	7/1/47—6/30/49	50,000	100	50,000	0	0
Wyoming	4/1/48—3/31/49	300	100	300	0	0
United States Total		$3,416,549	—	$551,511	—	$2,805,038
Hawaii	3/1/48—6/30/49	400	100	400	0	0
Puerto Rico	7/1/48—	120,000	10	12,000	90	108,000
Grand Total		$3,536,949		563,911		2,973,038

[a] Includes only direct appropriations and allocations. While cooperation with soil conservation districts by state and local agencies in their regular course of work is known to be substantial, no reliable basis has been developed for evaluating assistance of such agencies as Agricultural Extension Services, Wildlife Commissions, Forestry Departments, counties, and municipalities.

[b] Used by the soil conservation districts largely for:

1. Travel and expenses for members of district governing bodies while on official duties, including attendance at regular or called meetings.
2. Clerical, space, printing, mailing and other office expense.
3. Acquire, operate and maintain equipment, also services of contractors.
4. Field assistants necessary to operate and maintain field equipment.
5. Part or full-time work-manager for the district governing body.
6. Planting materials for use on critical areas.

Source: Soil Conservation Service, Washington, D. C.

Besides the annual contribution of approximately $50,000 by the State of Maryland for the advancement of the soil program, some of the Eastern Shore counties make appropriations for drainage improvement, which is a form of soil conservation. Caroline, Queen Annes, Worcester, and Wicomico Counties each spend about $10,000 annually for this purpose, while in Dorchester County the yearly outlay amounts to $3,600.

The availability of State and local funds makes it possible to broaden the scope of the soil conservation program. Such money can be used for purposes which cannot be financed out of Federal appropriations. The functions of the U. S. Soil Conservation Service at the local level consist primarily of making soil surveys of individual farms. These studies, which are undertaken at the request of the landowners to the local soil districts, indicate the type of soil, the degree of slope, and the amount of erosion that is taking place. The Soil Service also prepares a land-use map showing the capabilities of the soil, develops a farm plan covering the layout of the proposed terraces and drainage lines, the location of strip-crop areas and farm ponds, and makes recommendations for the improvement of pastures and crop production. Disbursements for printing, the employment of equipment operators for field demonstrations, and the hiring of qualified personnel on a temporary basis are among the expense items that must be borne entirely from State or local allocations.

The soil conservation program of Maryland is largely directed and financed by the Federal Government. It is well organized and competent personnel have been engaged to conduct the necessary technical and engineering studies. The favorable results to date have demonstrated the practical value of the methods and procedures employed. The extent of the Maryland program compares favorably with that for other sections of the country. The effectiveness of the present efforts to conserve the State's soil resources seems to be limited only by the funds available and the willingness of the landowners to cooperate.

About 7,000 farms, or roughly 15 per cent of the total for the State, are now included in the soil program. It is estimated that out of some 675,000 acres that should be strip-cropped, a total of 62,300 acres, or less than 10 per cent is being managed in that way. Of the estimated

800,000 acres that should be under contour cultivation, around 113,000 acres, or nearly 15 per cent, are now under this type of management.

Based upon what has been accomplished thus far, it is obvious that the greater part of the task still lies ahead. During the last three or four years, however, the program has been moving ahead at a more rapid pace. It is estimated that even if the recent rate of progress is maintained, it would still require about 60 years before suitable soil conservation measures could be established on the remaining farms in Maryland that are in need of such treatment. Some noted conservationists, who have given much thought to this problem, state that with sufficient financial encouragement all of the conversion work should be completed within 15 to 20 years.

In view of the importance of the proper conservation of our soil resources, the committee recommends that the State give every encouragement to the speeding up of the State soil program. It further recommends that a copy of this report on soils be sent to Maryland's Senators and Representatives in Congress with the request that they encourage the advancement of the program of the Soil Conservation Service.

Water

The fresh-water streams and the underground waters of Maryland represent an essential natural resource of great economic value. Due to the salt content of the surface waters in the tidewater districts, the State is dependent upon the upland streams and underground reserves for its supply of water for both domestic and industrial purposes. The residents of the Eastern Shore and Southern Maryland obtain practically all of their water requirements from underground sources, while those in Central and Western Maryland depend to a large extent upon the surface streams, although the ground water there is also of considerable importance.

The conservation of the water supplies of streams can be achieved in a substantial degree through the construction of impounding reservoirs which store up water for use during periods of minimum stream flow. Such measures, however, have little or no effect in decreasing the direct runoff from the land or of increasing the amount

of rainfall that percolates into the water-bearing strata. On the other hand, both of these factors may materially affect the efficiency of dams and reservoirs.

The continual denuding of the forest cover and the widespread use of improper methods of soil cultivation in many sections of Maryland have resulted in too small a percentage of the annual precipitation being retained where it falls to become, through percolation, a part of the ground water supply. The rapid runoff of an excessive proportion of rainfall retards the replenishment of the underground reserves which furnish a constant supply of water for springs, wells, and surface streams, and is a significant factor in increasing the range between the minimum and maximum volume of stream flow. Rapid runoff is also associated with soil erosion, the principal cause of the silting up of our streams and reservoirs.

While the value of Maryland's surface streams is apparent to everyone, the vital importance of its ground water resources is less generally understood. Besides the large number of individuals and the many different industries that depend upon private wells, practically all of the communities in tidewater Maryland and many of those in other parts of the State rely upon underground sources for their public water supplies. The Department of Geology, Mines, and Water Resources reports that of the approximately 175 public water systems in Maryland 113, or nearly two-thirds, depend entirely on ground water, and that an additional 18 are partially dependent on this source.

The most concentrated use of ground water anywhere in the State is in Baltimore and vicinity, where in recent years various industries have been consuming increasingly larger quantities of underground water. In 1942, according to the Department of Mines, Geology, and Water Resources, the daily consumption of ground water in the Baltimore area alone amounted to 50,000,000 gallons. This compares with an estimated daily consumption of only 14,000,000 gallons for the entire State in 1933. In some instances the overpumpage of underground water so depleted the local supply that salt water from the Bay or harbor was drawn into the wells. Pure water could formerly be obtained in the Baltimore area by digging a well a few feet deep, but in the early 1940's it would have been necessary to drill to a depth of 150 to 160 feet in some places before finding

water. The Baltimore situation has been further complicated by the fact that the constant expansion of the community's urban facilities, streets, buildings, etc., is making it more and more difficult for large quantities of water to seep into the ground. The uncontrolled appropriation of Baltimore's ground water supply threatened the usefulness of this important resource, which in monetary terms alone is valued at about $1,000,000 annually.

In Southern Maryland, especially around Solomons Island, the underground water conditions during the war years were somewhat similar to those experienced at Baltimore. Certain groundwater problems have recently been encountered at various places on the Eastern Shore, including Cambridge, Easton, Salisbury, and other communities. Groundwater difficulties have also occurred in parts of Western Maryland, where in some places the estimated decline in the water tables has been from 15 to 30 feet.

Long regarded as a replenishable resource available in unlimited quantities, comparatively little attention was given in the past to the conservation of the State's underground waters. The numerous problems that have arisen during the last few years, however, have demonstrated beyond question that ground water cannot be withdrawn more rapidly than its rate of replenishment without danger of depleting the supply and perhaps injuring the aquifers through contamination. Moreover, many communities and industrial users are greatly concerned over the adequacy of their ground water resources to meet increasing demands now or in the immediate future.

The first attempt on the part of the State to exercise control over the use and appropriation of Maryland's water resources was in 1933. In that year the Legislature created a Water Resources Commission "to conserve, protect, and utilize the water resources of the State in accordance with the best interests of the people of Maryland". While this law made it possible to exercise control over surface waters, no means were provided for its enforcement over ground waters, and no budgetary allotment was made for the investigation of underground water. Although considerable information had previously been developed for the larger surface streams, comparatively little was known about the extent and character of the State's ground water resources.

As a result of the critical ground water situation which occurred in the Baltimore area during the early part of the war, the State Board of Public Works and the city of Baltimore in 1942 supplied funds to the Department of Geology, Mines, and Water Resources for conducting the first comprehensive ground water investigation ever undertaken in Maryland. This study, together with other essential information that is still being accumulated, will make it possible to formulate a program for perpetuating Baltimore's valuable supply of underground water.

Much helpful information on underground conditions which heretofore has been unavailable, is now being obtained as a result of the Well Drillers' Act passed in 1945. Implementing the 1933 law, this new legislation not only provides for the licensing of well drillers and for the issuance of a special permit for each well, but requires drillers to furnish samples of geological material taken from the well, information on the yield of the well, and other pertinent data.

In 1946 the Department of Geology, Mines, and Water Resources presented a program of ground water investigations scheduled to cover the entire State by 1957. This program was designed primarily to prevent a situation like the one occurring in Baltimore in 1942 from developing in a new area. The appropriations granted the Department for this purpose have been less than required under that schedule, so that the inventory will not be completed until sometime after 1957, despite the fact that this information is needed now.

Under the 1946 program, the Southern Maryland counties were scheduled for completion in 1949 and the Eastern Shore counties in 1952. At the present rate of progress the Eastern Shore work cannot be initiated until after 1954. In the face of this deferment of the ground water studies on the Eastern Shore, numerous communities there have called upon the Department of Geology, Mines, and Water Resources for aid in solving their water supply problems. The city of Easton has appealed to the Legislative Council to initiate an immediate survey of the ground water resources of the Eastern Shore. Upon the request of the Legislative Council the Department presented a memorandum stating that this project can be completed in three years if an annual appropriation of $25,000.00 dedicated to that purpose be made available.

The inventorying of Maryland's surface waters through the establishment of stream gaging stations was inaugurated many years ago. By 1943 the State had 39 stream gaging stations in operation. As this number was considered insufficient to permit an adequate appraisal of Maryland's surface waters, the Department of Geology, Mines, and Water Resources recommended the establishment of 24 additional stations. Fourteen of these were added during the period from 1943 to 1947. For the biennium 1947-1949, the Department was allocated $10,000 less than the amount required to complete the gaging program by June 30, 1949. An appropriation of $10,000 for the remaining installations and $10,000 for operating the stations in the fiscal year 1950 will enable the Department to complete this program by June 30, 1950.

The present State laws governing the appropriation and use of Maryland's water resources appear to be adequate for protecting the public interest in these valuable assets, while the current investigations of the State's surface and underground waters will eventually provide it with the necessary information for their intelligent and equable administration.

Legislation regulating the use of our water resources and scientific studies describing their extent and location will not in themselves increase the total quantity of water available for consumption. Being directed chiefly toward securing the proper utilization of the supply on hand, such measures will not prevent the waste of rainfall resulting from excessive runoff, nor will they increase the amount of moisture that sinks into the ground. Fortunately, the management practices which have proven so successful in soil and forest conservation represent the best practicable means for retarding runoff after periods of rainfall and for building up the supply of underground water. In many respects, therefore, the question of conserving Maryland's forest, soil, and water resources presents a common problem, and that any remedial measures adopted for the improvement of one will be beneficial to the others.

In view of the fact that Maryland's consumption of water has for many years been increasing at a much faster rate than its growth in population, adequate steps must be taken to assure the proper conservation and utilization of

this essential natural resource. Since any program of water conservation must be based upon an accurate knowledge of the magnitude and extent of the State's surface and underground waters, the committee recommends:

1. The prompt completion of the stream gaging program as outlined in the Six-Year Conservation Program of the Board of Natural Resources.
2. The immediate inauguration of a comprehensive study of the underground waters of the Eastern Shore.

Forests

The present forest area of Maryland comprises around 2,700,000 acres, or about 43 per cent of its total land surface. Roughly nine-tenths of the State's forest area is under private ownership, nearly 45 per cent of which consists of farm woodlots on more than 27,000 individual farms. Of Maryland's publicly owned forest land, State forests embrace some 119,000 acres, the forest holdings administered by the Federal government amount to about 70,000 acres, the forested parts of the watershed properties owned by the cities of Baltimore and Frederick contain in the neighborhood of 16,000 acres and 8,000 acres, respectively, while a number of smaller woodland tracts are owned by other public agencies. The figure for State forests includes approximately 43,500 acres of submarginal lands which were turned over to the State by the U. S. Resettlement Administration under a 99-year lease.

The beginning of the first organized movement to increase the productivity of Maryland's forests dates back to 1906, when Messrs. John W. and Robert Garrett gave the State 1,917 acres of forest land in Garrett County with the understanding that it would create an agency to administer it. This led to the establishment in that same year of the State Board of Forestry, at which time the position of State Forester was also created.

The State at various times has received other gifts of land totaling upwards of 10,000 acres for use as State forests and parks. The larger tracts include 3,921 acres given by the County Commissioners of Cecil County, 1,791 acres by Charles McHenry Howard, 1,088 acres by the city of Frederick, 656 acres by Messrs. Henry and Julian LeRoy

White, 367 acres by Dr. William L. Abbott, 350 acres by Mr. and Mrs. Charles E. Hoye and 150 acres by Mr. and Mrs. C. H. Linville.

For many years, however, the State appropriations for the work of the Forestry Department were so meager that very little progress could be made toward conserving or improving Maryland's extensive forest area. The total forestry appropriations from the general funds of the State during the decade from 1907 to 1916 came to $71,083, or a yearly average of but $7,108. Similar appropriations for the succeeding 10 years averaged $27,765, while those for the period from 1927 through 1936 averaged $56,550. In the nine-year period from 1937 to 1945 the yearly average had increased to $70,486. Since 1945 the general-fund appropriations for the Department of State Forests and Parks have been substantially greater than in previous years. For 1946 and 1947 they were $173,214 and $190,602, respectively. In the next biennium, however, the allotments were increased to $303,874 in 1948 and to $301,561 in 1949.

The table on the following page shows the annual general-fund appropriations for the Department of State Forests and Parks and its predecessor agencies for the years 1907 through 1949. A summation of these appropriations for the 41-year period from 1907 to 1947, inclusive, amount to only $1,912,445, or a yearly average of $46,645. Even as late as 1943, Maryland's expenditures on forestry activities were considerably less than those for any other State having a comparable forest area.

Most of the construction work in the State forests and parks, such as the erection of cabins and other facilities, the building of roads, bridges, and telephone communications, the cleaning out of underbrush, etc., was performed by the Civilian Conservation Corps between 1933 and 1942. At one time there were as many as 15 CCC camps operating in the State forests and parks, with the personnel at each camp usually ranging between 175 and 225 young men. The State in 1933 entered into a contract with the Federal government for the maintenance of the projects developed by the Civilian Conservation Corps, but on account of its limited appropriations the Department of State Forests and Parks has found it difficult to carry out the terms of this agreement.

GENERAL-FUND APPROPRIATIONS FOR THE DEPARTMENT OF STATE FORESTS AND PARKS AND ITS PREDECESSOR AGENCIES 1907-1949, INCLUSIVE*

Year	*Amount*	*Year*	*Amount*
1907	$ 3,500	1929	$ 60,722
1908	3,500	1930	54,324
1909	4,000	1931	54,324
1910	4,000	1932	82,405
1911	5,000	1933	71,714
1912	8,583	1934	48,750
1913	10,000	1935	48,750
1914	10,000	1936	45,196
1915	10,000	1937	45,196
1916	12,500	1938	72,330
1917	15,000	1939	72,330
1918	14,000	1940	60,594
1919	16,132	1941	60,594
1920	26,054	1942	60,594
1921	27,813	1943	60,594
1922	32,682	1944	83,609
1923	36,578	1945	118,541
1924	31,358	1946	173,214
1925	38,917	1947	190,602
1926	39,125	1948	303,874
1927	37,726	1949	301,561
1928	61,594		

* Besides the appropriations it receives from the general funds of the State, the Department of State Forests and Parks derives additional income from four other sources. This supplemental revenue, however, must be spent for specific purposes provided for by law. The additional sources of income and the amount of money received during the fiscal year 1948 are as follows: Forest Reserve Fund ($41,606), Roadside Tree Fund ($80,855), Federal-State Cooperative Land Fund ($12,770), and the Federal allocations under the Clarke-McNary law ($110,000). The total income from these sources has increased rapidly during recent years. The total amount for 1943, for example, was $80,000, compared with $245,231 for 1948. The largest increases were in the Roadside Tree Fund and the Clarke-McNary allocations.

Generally speaking, the Forest Reserve Fund is made up of fines resulting from the violation of the State's forest laws and of the income from the sale of forest products or other revenues derived from the State forests. This money is dedicated by law to the protection, management, replacement, and extension of the State forest reserves. The Roadside Tree Fund is used to defray the cost of supervising the trimming of several million trees located along the highways of Maryland. The Federal-State Land Fund consists of the income received from the sale of products from the forest land leased from the Federal Government. This revenue must be employed exclusively for the protection and improvement of such areas. The Clarke-McNary allocations are restricted mainly to fire prevention measures.

Between 1912 and 1939 the State appropriated more than $200,000 for the purchase of land for State forests and parks. The Legislature in 1939 also authorized the expenditure of $100,000 out of the proceeds of a State bond issue for the acquisition, improvement, and development of forest lands, parks, and recreational areas. At the Special Session in 1948 the Legislature approved the expenditure of $3,553 for the purchase of Gathland State Park, in Washington County.

Source: Department of State Forests and Parks.

The six State parks which were in existence at the beginning of 1948 have involved but very little direct expense to the State. A considerable part of their total area of 4,042 acres was donated, and the major development work, as previously pointed out, was handled by the Civilian Conservation Corps. The Department of State Forests and Parks reports that during the past few years less than 10 per cent of the forestry appropriations from general funds have been used for the upkeep of the six State parks and the several recreational centers which are located in some of the State forests.

Until very recent years no Maryland appropriations had ever been made for the purchase of modern equipment for extinguishing forest fires. Prior to that time reliance was placed on manpower and hand tools. Between 1943 and 1945 Maryland made rapid strides in developing an efficient fire control organization. It obtained a sufficient quantity of modern equipment for meeting emergency situations and trained a large field staff in up-to-date methods of suppressing forest fires. The funds for purchasing the original equipment, which cost several hundred thousand dollars, were secured from the Federal government. Since 1945, however, the State has been making substantial outlays for the purchase of new fire control equipment.

The table presented below summarizes the State's forest fire record for the years from 1941 to 1947, inclusive. Throughout this period there has been a steady downward trend in both the number and extent of forest fires occurring in Maryland. While favorable weather conditions in some of the years might have contributed to the smaller losses, the functioning of the present fire-fighting organization with its motorized and mechanical equipment, two-way radio communications systems, and experienced personnel, have undoubtedly played an important part in reducing Maryland's losses from forest fires. An enlarged program of fire-prevention education and the enforcement of the regulations covering the burning of brush have also been of material help in keeping the number of forest fires at a minimum.

SUMMARY OF MARYLAND'S FOREST FIRE RECORD, 1941-1948

Year	*No. of Fires*	*Acreage Burned*	*Total Damage*
1941	2,045	46,574	$301,182
1942	1,525	39,756	256,669
1943	1,770	26,114	213,766
1944	731	6,515	50,357
1945	668	7,203	29,751
1946	716	7,249	82,861
1947	466	3,677	26,771

Note: During the spring of 1948 forest fires burned over an area of about 854 acres and involved a total damage of $4,749. This represented a considerable reduction from previous years in both the acreage burned and the amount of damage.

Source: Department of State Forests and Parks.

The timber stands of Maryland represent a great natural resource which is capable of producing a much larger volume of lumber and other forest products. The extent to which the productivity of Maryland's forests could be increased by intensive management is indicated by the fact that the present estimated annual growth of 40 cubic feet per acre for all the forests of the State could be gradually built up to about three times the current figure. Despite this situation, the volume of lumber and other forest products taken from Maryland's badly cut-over stands in 1941, the last prewar year, was valued at more than $8,800,000, based upon prices at the mill or point of production. Under existing conditions, the output reported for 1941 would probably be valued at twice that amount.

It is significant to note that the drain on the State's forest resources has long been in excess of the annual rate of growth. During the war years it was estimated that the total cut of all forest products exceeded the average yearly growth by about 50 per cent, and that even before the war the rate of depletion was at least 15 or 20 per cent in excess of the annual growth. If the forests of the State are to continue as an important source of employment and income, it is essential that a proper balance be established between production and growth. Unless good management practices are adopted in Maryland on an intensive scale, the supply of material that would be suitable for saw

timber will sooner or later approach the point of exhaustion.

The careless and destructive utilization of Maryland's valuable forest resources has contributed materially to the problem of soil erosion, the unstable flow of many of our surface streams, the gradual, but continuing, decline in the ground water level in various parts of the State, and to the problem of maintaining suitable natural habitats for fish and game. A skillfully managed forest can usually serve all of these purposes without interfering with the production of timber and other forest products.

The present unsatisfactory condition of Maryland's woodland areas is due primarily to destructive lumbering practices over a long period and to extensive damage by fire. This neglect of our forests cannot be charged to the Department of State Forests and Parks or to its predecessor organizations, since these agencies have not been in a position to carry out a comprehensive program of forest conservation. The small sums which have been appropriated for forestry work in the past have made it necessary for them to restrict their activities to the barest essentials.

As a result of prolonged abuse and neglect, the forests of the State not only are in a seriously deteriorated condition but are especially deficient with respect to large timber. A survey conducted a few years ago disclosed that only about 13 per cent of Maryland's forest acreage could be classed as saw-timber areas. The length of time required for growing another crop of saw timber makes it highly important that a considerable portion of the State's forest area be placed under intensive management without delay. The forest resources of the future will depend largely upon what is done now.

With the recent establishment of an adequate fire-fighting organization one of the two major problems which have been retarding the development of our forest resources is being rapidly brought under control. The other problem—namely, the question of securing the widespread adoption of higher management standards for safeguarding the productivity of private forest lands—involves a long-range program which is now being put into effect by the Department of State Forests and Parks.

Recognizing the need for the proper management of the State's wooded areas, the Legislature in 1943 passed a new forestry law which has aroused great interest both in Maryland and in other States. Known as the Forest Conservency Districts Act, this law authorizes the Commission of State Forests and Parks to establish rules and regulations governing forestry practices on privately owned timberlands. The Commission also is empowered to appoint district forestry boards to assist in carrying out the purposes of the Act. At the present time local boards are functioning in 12 counties, while in 7 other counties they are in the process of being organized. The active cooperation of the district boards is proving to be very helpful in securing a more widespread adoption of sound forestry-management practices. Since private landowners are generally in need of technical assistance in the handling of their forest problems, it is expected that an assistant forester will eventually be assigned to work directly with each of the boards.

While every effort should be made to secure the adoption of proper conservation methods on the existing forest areas of the State, there still remains the question of what to do with the large acreages of submarginal lands which are producing no earnings for their owners or revenue to the State. The extent of the idle lands in Maryland which are better suited for growing trees than for raising farm crops is estimated at approximately 400,000 acres. Since the submarginal areas represent a substantial proportion of Maryland's total land area of 6,327,680 acres, it is highly important to the economy of the State that these lands be placed back into timber production as promptly as possible.

The general condition of Maryland's forests at the beginning of the twentieth century was similar to that existing in many other States. The committee therefore contacted the forestry departments of various States in order to ascertain the manner in which they are handling their problems of reforestation and to develop a basis for comparing their accomplishments with the situation obtaining in Maryland.

New York State, for example, has been reforesting its submarginal lands since 1901, apparently beginning in a small way and then gradually increasing the size of the program. In the 40-year period from 1901 through 1940 a

total of 624,490,633 seedling trees were planted there. Based upon the use of 1,000 trees to the acre, this figure would indicate that some 624,000 acres were reforested during that period, or an average of 15,600 acres per year. At one period when 22,000,000 seedlings were being planted annually, approximately 80 per cent of them were taken by private landowners, with the remainder being planted on State-owned land. The New York State nurseries are now producing 20,000,000 seedlings annually.

During the past twenty-five years private landowners in Pennsylvania have planted 166,000,000 seedlings, or an average of 6,640,000 trees per year. In other words, approximately 166,000 acres of privately owned land have been reforested within the period in question. The Pennsylvania State nurseries are presently turning out 10,000,000 seedlings per year, and an annual production of 50,000,000 is anticipated by 1951.

This year's output of seedling trees in Wisconsin is reported to be 12,000,000. Its Conservation Commission has scheduled a production of 35,000,000 trees for next year, with an ultimate goal of twice that number for planting on the State's millions of acres of idle land.

Although West Virginia has been backward in reforesting its cut-over and submarginal areas, it is now expanding its nursery in order to take care of an increasing demand for forest planting stock. The current production of the State nursery is in excess of 600,000 seedlings per year, and arrangements have been made with one of the nurseries of the U. S. Forest Service to produce stock for its use. The State plans to distribute 1,500,000 seedlings from the Government nursery during the fall of 1949 and the spring of 1950.

While the public ownership of forest land is concentrated largely in the hands of the Federal Government and the individual States, there is an increasing tendency toward the acquisition of forest properties by local government units. Generally referred to as community forests, the several thousand wooded tracts owned by counties, cities, towns, school districts, etc., comprise a total of nearly 4,500,000 acres in 43 different States. The U. S. Forest Service reports that since the close of the war there has been a steady increase in the community-forest movement.

Community forests are especially numerous in Massachusetts, Michigan, Minnesota, New Hampshire, New York, Pennsylvania, Wisconsin, and several other states. New York's 702 community forests embrace more than 100,000 acres, and the 112 in Pennsylvania contain upwards of 130,000 acres. With almost 2,400,000 acres in its 300-odd community forests, Wisconsin has over half the country's total area in this classification. The community forests of Minnesota occupy about 675,000 acres, and those of Oregon cover some 240,000 acres. Maryland has at the present time 7 community forests with an aggregate area of around 30,000 acres, most of which is on lands surrounding municipal water supplies.

Besides their value in watershed protection, public recreation, game management, and timber production, community forests are particularly important from the standpoint of promoting greater local interest in forestry and other types of conservation. In view of the many practical benefits that can be derived from community forests, it would seem desirable for the State to encourage the various political subdivisions, as well as civic bodies, schools, and other non-profit organizations, to acquire and develop woodland tracts in the public interest.

During the 40 years that have elapsed since the passage of Maryland's original forestry law a number of States have reforested a considerable part of their unproductive lands, but that our State has made little or no attempt to engage in forest planting. In favorable situations the process of natural reseeding will enable the lands, in the course of time, to grow up again in forests. In other areas, however, tree-planting will be necessary in order to assure a future forest growth.

The production of the Maryland State nurseries during the past five years has averaged 485,900 seedlings annually. The normal output a decade or so ago was upwards of a million trees. Approximately 100 acres of land were recently purchased for a new State nursery, which will have a potential yearly capacity of 10,000,000 seedlings.

The Department of State Forests and Parks estimates that about half of Maryland's 400,000 acres of submarginal lands do not need planting immediately—for in the next two decades they may become partially reseeded by nat-

ural means. The remaining 200,000 acres could form the nucleus of a large-scale planting program, in which the landowners would be encouraged either to plant or pay for the cost of planting the trees. In order to undertake such a program at the rate of 10,000 acres per year, the Department of State Forests and Parks estimates that it would require an appropriation of approximately $170,000 for the first biennium. Of this amount some $105,000 would be needed during the first year for buildings, equipment, and technical service to private landowners, while about $65,000 would be required during the second year. After the initial two-year period the annual cost would tend to be around $65,000 per year. This expenditure would cover both the necessary technical services and the supplying of some 10,000,000 seedlings per year without cost to the landowners.

Maryland is suffering an annual loss of many millions of dollars from its extensive areas of understocked forests and idle submarginal lands. Considering the favorable growing conditions existing in many parts of the State and the large potential demand for lumber and other wood products, the practice of intensive forestry in Maryland should become an increasingly important factor in the State's economic structure. In order that the State might capitalize more fully upon its many natural advantages in this field, the committee recommends:

1. The immediate establishment of Forest Conservency Districts in the several counties in which such organizations are not now in operation.

2. The intensification of the present program for encouraging private owners to adopt better management practices on their forest properties.

3. The early inauguration of a large-scale program of tree planting, so that at least half of the State's estimated 400,000 acres of privately owned submarginal land can be reforested within a period of 20 years.

4. That such program be based primarily upon securing the cooperation of the landowners in planting the trees or paying for the cost of planting, with the State supplying without charge both the necessary technical assistance and the required number of seedling trees.

5. The appropriation of $105,000 to cover the estimated cost of the first year's operation of the projected tree-planting program and $65,000 for the second year, and that such funds be specifically earmarked for reforestation.

6. A sizeable expansion in the annual output of the State nursery in order to meet the needs of the planting program, as well as other demands for tree stock.

APPENDIX VI

Report of the Committee on Law Enforcement.

The enforcement of laws relating to the Department of Tidewater Fisheries, and especially having to do with the protection of oysters, fish, and crabs against over-fishing is notoriously difficult. There are many inherent difficulties due to the nature of the problems involved, some of which are: The large expanse of water, the comparative ease with which violators can conceal their activities in times of fog, during the hours after dark, or when officers are elsewhere; the difficulty of maintaining readily discernible lines of demarcation with respect to various areas of land covered by water; a not unnatural sympathy among the people of the tidewater counties for an oysterman, who, by force of circumstances, makes his living the hard way; and a traditional feeling in many parts of the State that natural resources are properly the subject matter of political maneuvering and protection.

Heretofore, the problem has been increasingly difficult because of the economic pressure on the oysterman. A steadily declining supply of oysters has necessitated an increasing efficiency in the methods of taking oysters—some legal and some otherwise. The supply is thus further reduced and added pressure on the oysterman has driven him to further intensify his efforts. If this vicious circle is broken by a substantial increase in the oysters available many problems will be simplified, including that of enforcement.

An enforcement officer charged with duties in tidewater must not only possess the usual capacity of a police officer to apprehend offenders and to present cases against them in a convincing manner to the trial tribunal, but he must also possess, or at least have available, a very special skill in connection with operating marine craft and navigating the waters assigned to him.

These problems suggest the necessity of having the very best personnel engaged in this work under the ablest leadership. The fact that the enforcement of tidewater laws has left much to be desired is understandable and freely conceded by almost everyone, from the humblest tonger to the chairman of the Department.

The Department of Tidewater Fisheries has heretofore been charged with the dual responsibility of not only administering a very important natural resource of the State and with conserving and redeveloping that resource, but also with the enforcement of laws affecting their problem. It is suggested that these two functions are essentially dissimilar and in many instances are actually conflicting. Thus it is difficult to cultivate a friendly and cooperative attitude on the part of the watermen with whom the Department must work and at the same time have those watermen fear the Department because of possible criminal prosecution for violations.

The Tidewater Department has a force of eighty-five men who are engaged in inspection and enforcement duties, with an annual payroll of approximately $190,000.00. This force has been accumulated over a long period of time and many of the men now covered by the Merit System have served with the Tidewater Department or its predecessors for many years. Until recent years many of these men received their appointments through political influence, regard themselves as important cogs in local political organizations and have found it difficult to divorce their enforcement duties from their political loyalties. Many of these men are well informed concerning local conditions and are admirably equipped to furnish the skill needed for motorboat operation in their respective communities. However, their value as enforcement officers has been weakened by their connections with the persons among whom they must work and by the fact that many of them have had little or no professional training in the matter of law enforcement. In recent years the Commission has obtained the services of a group of younger men who have received some limited amount of professional training in this field and are regarded as making progress in the rather difficult task assigned to them.

Notwithstanding this progress, however, it is felt that, for reasons indicated above, it would be better to divorce the enforcement problem entirely from the Department of Tidewater Fisheries, especially as this course would free the Department to devote its capacities and energies to the very important program of expansion and rehabilitation which the Commission proposes to recommend. The Department of State Police is the logical instrumentality to

take this responsibility. Those members of the present force who are found to meet the specifications for State Police Officers could be absorbed into that force. Those who are not acceptable as officers could be used as navigators, etc., by the State Police, or could perhaps be utilized by the Department of Tidewater Fisheries in the operation of its expanded program. Any man with, say, five years service, who cannot be thus used should be protected in his right to retirement pay, be given a severance bonus of say, six months salary, and be permitted to lease oyster ground with same priority as a licensed oysterman.

The State Police have an esprit de corps and a tradition for political non-interference which would be especially valuable in bringing to the problem of conservation in the tidewater areas a respect for law and for conservation practices which has heretofore been noticeably lacking.

Operation of this unit as part of the State Police would prevent a certain amount of duplication of overhead and administrative expense. Obviously the State Police could not assume this additional responsibility unless there were provided:

1. An adequate increase in officer personnel,

2. Skilled personnel needed in connection with navigation, and

3. First class equipment, including modern, high speed boats equipped with telephones and perhaps with radar.

Aviation can obviously be an important factor in law enforcement on tidewater and while the Department of Tidewater Fisheries has a plane at its disposal it is believed that the use of the air should be substantially expanded. It is suggested that the State Police be charged with the enforcement of laws and regulations having to do with the State Aviation Commission. The use of planes throughout the State by the State Police could be a very important addition to the effectiveness of police work generally.

It is suggested that a study be made of the problem by or on behalf of Col. Ober, Superintendent of State Police, in order that an intelligent opinion may be formed as to what additional personnel will be required, what addi-

tional facilities should be obtained, and what budget would be required in order to render effective police protection in the tidewater areas. In this connection it is pointed out that if substantial development and rehabilitation is to be done by private investment it is imperative that those interests be afforded a reasonable degree of police protection. This will certainly be imperative until a public opinion can be developed in support of private operation.

There are certain types of violations of the oyster laws which are persisted in notwithstanding liability for criminal prosecution and indeed in spite of such prosecution. It is suggested that the Department of Tidewater Fisheries be empowered to institute a proceeding in any court of appropriate jurisdiction against any person, who has engaged or is about to engage in any acts or practices which constitute or will constitute a violation of any of the provisions of the conservation statutes, for an order of court enjoining such acts or practices, or for an order enforcing compliance with any appropriate provisions of any such statute and that upon a showing that such person has engaged or is about to engage in any such acts or practices that a permanent or temporary injunction, restraining order, or other order shall be granted without bond.

It is suggested that the licensing system for those persons engaged in the seafood industry should be revised so that all persons engaging in taking, transporting, or processing seafood be required to obtain a license from the Department of Tidewater Fisheries. The license fee need not be substantial, but severe penalties should be imposed upon any person who engages in any aspect of the seafood business without a license or after his license shall have been suspended or revoked. Authority should be contained in the statute permitting the suspension or the revocation of any license upon a showing at a hearing to be held after reasonable notice to the party involved, that such party has violated any statute having to do with the conservation of the natural resources of the State. The power to suspend or revoke could be vested in the Department of Tidewater Fisheries but inasmuch as it seems desirable that this department be free to deal with the tidewater people without any fear on their part that the department can use its power to punish the persons with whom it deals, we deem it desirable that the power of suspension or revocation be vested elsewhere. We suggest that the Board

of Natural Resources be charged with the responsibility for the suspension or revocation of licenses and that it designate some person as a Hearing Commissioner to travel about the state and to hear charges that licenses should be suspended or revoked. Such charges should be made either by the Department of Tidewater Fisheries or by the State Police. This practice will parallel that now followed by the Commissioner of Motor Vehicles with respect to the revocation and suspension of drivers' permits. The statute should provide that any person aggrieved by the decision of the Hearing Commissioner may within ten days appeal to the judge of the Circuit Court in the circuit in which the respondent in such proceeding may reside. Such appeal would not operate as a stay unless the Court otherwise ordered and would be heard by the court without the intervention of a jury. The court would be given authority to affirm, modify, or reverse the action of the Hearing Commissioner.

Accordingly the Committee recommends:

1. That all enforcement duties be transferred from the Department of Tidewater Fisheries to the Maryland State Police, and preliminary thereto that the Governor be requested to direct an appropriate study to be made in order that it may be determined what will be required in order to do an effective job.

2. That the equity courts be given power to restrain violation of the laws dealing with the subject of tidewater conservation, and,

3. That a system of licensing be instituted for all persons engaged in the taking, transporting, or processing of seafood, and that such license be subject to suspension or revocation after an appropriate hearing, with the right of appeal.

APPENDIX VII

The Chesapeake Bay Institute

The Office of Naval Research, the State of Virginia, and the State of Maryland have supplied funds in equal amounts for the development of a Chesapeake program under the sponsorship of The Johns Hopkins University. The work will be organized under the name of the Chesapeake Bay Institute. While the biology of the Chesapeake Bay has been studied, little is known about the physical and chemical conditions that govern its capacity to produce sea food. The Governors of Virginia and Maryland have taken a personal interest in the project and hope that progress will be made in achieving certain purposes of benefit to both states. As outlined by a research committee these purposes are:

(a) to make field surveys and conduct laboratory research, compile and analyze technical data, prepare material for manuals, reports and charts of the Chesapeake Bay area, as follows:

  (i) course and strength of permanent currents;

  (ii) interaction of sea and atmosphere, including wind waves, swell, and surf;

  (iii) distribution of marine organisms;

  (iv) physical characteristics of sea bottom and beaches;

  (v) diffusion of salts, sedimentary material and pollution elements in Bay waters.

(b) to set up specific curricula and facilities within the University for fundamental training in the oceanographic sciences.

While a certain amount of oceanographic work is done in perhaps a dozen institutions, the two principal laboratories in the United States are the Woods Hole Oceanographic Institution at Woods Hole, Massachusetts, and the Scripps Institution for Oceanography at La Jolla, California.

The advantages offered by the Chesapeake Bay Institute are not found in any of the existing organizations. Chesa-

peake Bay is the largest and most significant water-shed bay unit of the Atlantic Coast with respect to both its ecology and its economy. Moreover, it is in shallow, embayed, coastal waters where we have our greatest deficiency of scientific knowledge. Working with the two other principal oceanographical centers, each with its special advantages, something like a national oceanographic program is possible. The training feature will result in high quality men who will have the inspiration of field work and the advantages of a participating university. The student will secure varied experience under diverse conditions.

The Navy is interested both in the training feature of the Chesapeake Bay Institute and in the hydrographic findings as well as in the marine ecology. Finally, there is immediate and rapidly increasing concern in both Maryland and Virginia for a sound conservation program in which the Bay plays a conspicuous part. The program of the Bay will not duplicate surveys now under way or the work of existing laboratories. In the course of time its maps and scientific findings will replace the surveys of 36 years ago, since when many changes have taken place, some of them profound.

APPENDIX VIII

Historical Review of Maryland's Conservation Laws and Administrative Organization

Conservation of natural resources as that term is understood today was first made the subject of legislative enactment in the year 1833. It was in that year that laws were passed providing for the appointment of a State Geologist, and prohibiting the taking or catching of oysters in any waters of the State with a scoop or drag. The attention of the legislative branch of the Government of Maryland was next directed to Conservation Practices in 1842 when fish and game regulations were promulgated. These regulations, inter alia, prohibited the shooting of water fowl, bedded in flocks, from any vessel or craft of any kind. Non-residents were forbidden to set gill nets in the Chesapeake Bay, and all seine hauling was prohibited between June 10th and September 1st. These regulations also outlawed the whipping or beating of certain waters in the Potomac River for purpose of driving fish in nets or baskets, the erection of any fish-pot or fishing in any manner except with a gig, trot line, dip net or angling rod. These last mentioned regulations were passed in 1864. Fishing seasons for shad and herring in the Potomac were established in 1870; and a closed season for trout and limitation to fishing with hook and line only followed in 1874.

In the same year the State Fishery Force was created and by subsequent enactment in 1894, 1900, 1904 the Board of Public Works was empowered to appoint a commander of the State Fishery Force. The duties of the Force were to guard the waters of the State, which were divided into seven districts. It was also in 1874 and later in 1888 that the Governor by and with the consent of the Senate was empowered to appoint biannially two competent persons to serve as Commissioners of the newly created Commission of Fisheries. These enactments were followed in 1878 by regulations establishing closed seasons, size rates and protection of the eggs of diamond-back terrapin; as well as closed seasons on partridge, woodcock, pheasant and rabbits.

The offices of General Measures and Inspectors of Oysters were set up in 1894, and their duties were enlarged and delineated in 1900, 1906. When the Legislature met in

1896 and again in 1904, the office of State Game Warden was established. The Warden was to be appointed by the Governor, and his duties, with the help of his deputies, were to prosecute all persons and organizations having in their possession any game or fish contrary to any general and local fish laws in the State. These enactments also authorized the Governor to instruct the State Commissioner of the Fishery Force to assist the Warden in the enforcement of the game and fish laws of the State.

The year 1906 witnessed the creation of two important Conservation Boards. These were the Board of Shell-fish Commissioners and the State Board of Forestry. The former body was authorized to make a survey of natural oyster beds, bars and rocks of the State, as well as a survey of all bottoms of the tributaries of the Chesapeake Bay where grass grows and where it is profitable to scrape for soft shell or shedder crabs. The Forestry Board consisted of seven members, namely, the Governor, Comptroller, President of Johns Hopkins University, President of Maryland State Agricultural College, the State Geologist and one citizen. The law which established the Forestry Board also provided for the appointment of a State Forester. In 1922 this Board was abolished and its powers and duties were transferred to the Regents of the University of Maryland. In the same year (1922) a Department of Forestry with an Advisory Board of five members was created. The Regents were authorized to appoint a State Forester to be the head of the Department of Forestry.

It was not until 1910 that the free State of Maryland possessed a State Conservation Bureau as such. The laws of that year created such a Bureau under the direction of a Commission of three members appointed by the Governor. Its objects were stated to be the preparation of a "study of such problems connected with utilization and conservation of the natural resources of the State as in the opinion of the Commissioners seems wise, or as the general assembly may direct"; cooperation with other State Bureaus in such manner as the Commission may think best; cooperation with the Federal Government, or with National Organizations in the carrying out of plans for the Conservation of the State resources and preparation of publications on natural resources. A Conservation Commission was created and established by the laws of 1916. This

Commission was short-lived, having been abolished just six years later, in 1922. The same law which abolished the Commission created a Conservation Commissioner who was invested with all of the powers, rights, and duties of the now defunct Conservation Commission. The Commissioner was given general supervisory power, regulation and control over oysters, and clams, fish, crabs, terrapin and wild fowl, birds, game and fur-bearing animals. He was also authorized to appoint the following staff officers and to supervise their work: (1) State Engineer, to have charge of surveying and marking of natural oyster bars, reserved areas, leased bottoms and clam grounds. The Engineer was also placed in charge of all experimental work. (2) Commander of the State Fishery Force: To have charge of all boats composing the State Fishery Force or Oyster Navy, and to appoint the deputy commanders of the boats of the Fishery Force and Oyster Navy. (3) The State Game Warden. The Commissioner was authorized and empowered to take over the exercise of the functions, discretions, powers and duties heretofore exercised by the Commissioners of Fishery; Board of Shell-fish Commissioners; the State Conservation Bureau; the Commander of the State Fishery Force and the State Game Warden.

It was also in the year 1922 that the State Parks were placed under the jurisdiction of the Department of Forestry of the University of Maryland. This act set up the following administrative Divisions within the Department: Division of State Forests, Division of State Parks, Division of Forest Extension, and Division of Forest Protection.

The legislature of 1922 evidently was quite a conservation-minded one, for it also created a State Geological and Economic Survey Commission composed of the President of Johns Hopkins University and two other members appointed by the Governor biennially to advise, counsel and aid in connection with the said survey.

When the legislature met in 1929 the Conservation Department was authorized to investigate and punish all acts of polluting water-courses, wells, springs, etc. This same legislative assembly created the Water Front Commission. Its powers and duties were to examine, investigate and recommend to the legislature plans and policies for the protecting of water front and waterways of the State against erosion; to cooperate in carrying into effect plans

or recommendations for the improvement or devolepment of water front property and waterways within the State as may be adopted by the legislaure; and to represent the State in all matters affecting waterways and/or water front property. The powers of the State Conservation Department were further enlarged in 1929 to include the control of the mining of rare earth and minerals.

Authorization to develop and devise a general water resources Conservation Program for the State came along in 1933. The legislative session which met in that year created a Water Resources Commission consisting of the Chief Sanitary Engineer of the State Department of Health, the Chairman of the Public Service Commission, the State Geologist and two other members to be appointed by the Governor.

In 1937 the State Soil Conservation Committee was created. This body was carved out of and placed under the control of the State Board of Agriculture and the Regents of the University of Maryland. The following officers were made members of this Committee: The Director of the Maryland Experiment Station, the Director of the Maryland Extension Service, the Maryland State Forester, the Chairman of the State Board of Agriculture, and the Principal Administrative officer for Maryland of the Soil Conservation Service, United States Department of Agriculture.

The next session of the Maryland legislature assented to the Act of Congress (50 Stat. 917) which provided for aids to the States' Wildlife Restoration Projects. This legislative assembly authorized and provided for State cooperation with the Federal Government in carrying out the provisions of the above mentioned Act of Congress. This year also saw the creation of a Commission of Fisheries which succeeded to the powers, duties and functions of the Conservation Commission with respect to oysters, shell-fish, fish, fisheries and hatcheries within the bounds of Tidewater. In 1941 the name of this body was changed to Commission of Tidewater Fisheries. The 1939 assembly also gave birth to the Maryland State Game and Inland Fish Commission whose name was also subsequently (in 1941) changed to the Game and Inland Fish Commission. The State Publicity Commission to advertise the sport of fishing, water industry, oysters, crab, seafood products and

other natural resources and the recreational areas and places of scenic and historical interest in the State was created also during this session.

It soon became apparent that the various boards and Commissions were in sore need of an overall coordinating organization, and so, in 1941, in order to supply this need, the Board of Natural Resources was created.

Since 1922 nothing had been done to modernize and streamline the supervision and administration of our forest and park services which were still under the jurisdiction of the University of Maryland. However in 1941 laws were passed which created the Department of State Forests and Parks to administer and manage State-owned and leased Forests and Parks, and to administer all laws relating to fire control, roadside trees, restoration of deforested or denuded areas, and the operation of the State Forest Nursery. Also created in 1941 was a Commission of State Forests and Parks to supersede the old advisory Board of Forestry and the Regents of the University of Maryland in supervising and directing the affairs of the Department.

Another long neglected phase of Conservation was revamped in 1941 when legislative enactments were passed which set up the Department of Geology, Mines and Water Resources, which was designed to supersede the old State Geological and Economic Advisory Commission, the Bureau of Mines, the Water Front Commission and the Water Resources Commission.

In 1943, the existing laws pertaining to birds, game and inland water fish were repealed and new laws were created which, though keeping many of the old provisions, revised and reorganized them, and added certain new ones. Briefly, the 1943 Bird, Game and Fish law consisted of the following; Detailed regulations covering the taking of birds, game and inland water fish, establishment of seasons when each of the species of game and fish found in Maryland may be taken, the duties of the Game Warden and his Deputies, specific instructions concerning the licensing of hunters and anglers, the outlawing of hunting with Ferrets and Weasels and the use of poison, making it unlawful to take nests or eggs of migratory birds, setting up provisions concerning use of guns and decoys, giving detailed instructions regarding the placing of duck blinds and the rights of Riparian owners concerning same. This law also

authorized the acquisition of lands by the State for use as Game Refuges. Further, it sets out trapping regulations and permit requirements therefor. The 1943 law also placed the duty upon dam owners of providing for and maintaining fish ladders.

The year 1943 also saw certain changes in our Forestry Administration. Regulations enacted during that year vested in the Department of State Forests and Parks the administration of Forest Conservation practices in private and public forests. These laws also empower the State Forests and Parks Commission to assist the Forestry Department in administering Forest Conservation Laws, and directs the aforesaid Commission to divide the State into an appropriate number of districts and to establish a District Forestry Board for each. These Boards are to promote private forestry, advise owners concerning forest problems, assist County assessors in appraising forest lands, disseminate Forest Conservation information, secure the cooperation of United States Agencies in conserving the Forest Resources of the State, receive and pass on flood control measures, seeding and planting, and the development of wildlife. These District Boards were given power to enter any woodland to perform their duties and were authorized to develop comprehensive forest management plans, enforce the Commission rules and regulations concerning restocking and reserving forest growth, and the prevention of clear cutting. Further, the 1943 Forestry laws set out the duties of the District Forester, and provided for the licensing of saw mills. In 1945 the legislative enactments authorized the Commission of State Forests and Parks to examine and pass on applicants for certification as tree experts, set up qualifications therefor, and provided for examinations to be taken by such applicants.

Changes were brought about in the fishing laws of the State in 1943, 1945 and 1947. For purposes of clarity and facility in organization of materials the laws of these three years will be considered together. These enactments outlaw the taking of fin fish in tidal water by means of gig, gig-iron, purse net, buck net, beam trawl, otter trawl, trammel net, troll net or drag net. Fishing by any means other than hook and line, and dipnet, fyke, hoop net, or pound net less than forty yards long, except for commercial purposes, was made unlawful unless licensed by the Commission of Tidewater Fisheries. Detailed instructions and

regulations regarding the use of pound and stake nets were set out. The Commission was authorized to promulgate rules and regulations governing the taking of sturgeon from the waters of the State. These laws also directed the Commission to prepare estimates of the quantity of fin fish available during the succeeding licensed year, and of the number and types of nets that could be profitably employed without injury to the State's Fishery. Closed seasons and minimum sized limits for black bass, pike and wall-eye pike were established. It was directed that no rules or regulations of the Commission of Tidewater Fisheries should become effective until approved by the Board of Natural Resources. Owning, selling or transporting any spawning lobster or any lobster shorter than 3⅛ inches was made illegal.

Rather sweeping changes were effected in 1947 on the subject of pollution. The legislative assembly of that year enacted laws creating the Maryland Water Pollution Control Commission composed of the Director of the State Department of Health, the Chairman of the Board of Natural Resources, the State Game Warden, the Director of the Department of Research and Education, and three members to be appointed by the Governor. The duties of this Commission are to study, investigate and recommend ways and means of eliminating from the water of the State, as far as practical, pollutive substances, and to recommend measures to prevent pollution. This Commission is authorized by the statute to encourage voluntary cooperation by the citizens of the State in restoring and preserving the purity of the State's water; to coordinate and stimulate the activities of the agencies now concerned with water pollution problems, to enforce present anti-pollution laws; to supplement present pollution data by study and research; to aid and cooperate with other State agencies in enforcing water pollution laws; to recommend sewage standards; to direct persons causing pollution to reduce, control and abate same; to establish water quality standards and to cooperate with other State and Federal pollution agencies. This act also makes it unlawful for anyone to discharge or permit to be discharged into any waters of the State any waste or pollutive substance.

The 1947 general assembly enacted certain legislation pertaining to oysters. Briefly, this statute outlaws the

taking of oysters or clams by any means other than rakes, tongs, patent tongs, dredges or hand scrapes. It provides for licensing the privilege of taking oysters and clams and sets out the hours during which they may be taken. The 1947 law requires that oysters must be culled where they are taken and directs that culls and shells must be returned to the bar whence they came. Size limits on oysters are set out and it is made illegal to possess or transport unculled oysters. Detailed instructions concerning the applications for licenses and disposal of license fees are included. As a result of this statute it is unlawful to dredge by motor except on leased bottoms and this may be done only if a license is procured. A special license is required for dredging in the Chesapeake Bay and detailed instructions are given concerning procurement of same and disposition of fees. This enactment outlaws dredging with power boats, sets up dredge specifications and prohibits the possession of firearms larger than a pistol except for two shotguns, ten gauge or under, on dredge boats. Detailed County dredge regulations are set out. The law reserves the Potomac River Fishery, including its fish, oysters, and crabs to the citizens of Maryland and Virginia. Provisions are made for licensing Maryland and Virginia residents to enjoy this fishery. Dredging in the Potomac River is prohibited and a closed season on oystering is provided for. Culling regulations and size limits are set up and made applicable to the Potomac River. The 1947 law concerning the Potomac River Fishery allows removal of such oysters caught above North Point, Virginia and Cedar Point, Maryland, from the Potomac for planting in other Maryland or Virginia waters if permits for such removals are secured. Concurrent jurisdiction is given to Maryland and Virginia enforcement officers and courts to arrest for and try violations of these regulations. Under this statute a license is required for packing and dealing in oysters, and licensees are bound to turn back to the State twenty per cent (20%) of the shells shucked each season or their value in cash. These shells are to be transplated on bars selected by the Department. Packing and canning between April 15 and September 1 is prohibited and measures for oysters and shells as well as measures to be used in paying shuckers are set up. The Department of Tidewater Fisheries is directed to take measures to increase the produc-

tivity of natural bars in the State, and is authorized to close any part of the natural bars in the Chesapeake Bay dredging areas when it deems such action necessary. The Department is further authorized to transplant oysters, shells and other cultch from one closed area to another, to utilize said oysters produced on shells planted by the Department and to transplant and utilize any other said oysters which accumulated on undesirable marketing areas. The Department is empowered to lease land to private individuals for the cultivation of oysters (with the exception of certain specified non-leaseable areas) and is directed to re-survey the State waters and re-classify the same from excluded (non-leaseable) natural bars to leaseable barren bottoms after advertising and re-examination. Such leased land is to be marked clearly by stakes or buoys. Rights of lessees are set out and appropriation of submerged lands without a lease is prohibited. This statute gives the methods for taking privately cultivated oysters and sets up a closed season for same. This law allows the taking of oysters from Chesapeake Bay bars designated by the Department for one month in each year to be used as seed oysters on leased bottoms. The statute also provides for licensing the taking of clams.

It may not be inappropriate at this point to briefly trace the history of the Maryland leasing laws as they pertain to shell-fish. By Ch. 539 of the Laws of 1912 the Board of Shell-Fish Commissioners were directed to lease in the name of the State, tracts or parcels of land under the waters of the State in areas to be opened for culture to residents of Maryland. These areas were to be at least one acre in size if situated in a County and at least five acres in size if in any other location. Leases were limited to five hundred acres and the terms of such leases were set at twenty years. Assignments and transfers of leases were prohibited. Riparian owners were permitted to make private leasing arrangements for a limited period of time after the passage of this Act. Land was to be leased only for the purpose of cultivating and planting oysters. Dredging on leased bottoms without a license was outlawed, as well as dredging throughout the State with power boats. This same Act directed the Board of Shell-Fish Commissioners to buy shells from the lowest bidders and distribute them on natural bars.

The next session of the legislature promptly emasculated the 1912 Oyster Law by enacting Ch. 265 of the Laws of 1914. This statute, inter alia, gave the right to plant and cultivate oysters in the waters of the State to any resident of Maryland. However, no organization or joint stock company was allowed to lease any oyster lands. The provisions of the statute which removed all the teeth from the 1912 Law was the one which excluded from cultivation all natural beds or bars, and the provision which defined natural bars as all those where "the natural growth of oysters is of such abundance that the public have successfully resorted to such beds or bars for a livelihood whether continuously or at intervals during any oyster season within five years prior to the time of the filing of the application for a lease of the area in question," or within five years of making "the re-survey under section 94-A of this Act." The survey referred to above was to be made to delineate the natural bars of the State and to make them as nearly rectangular as possible, whether this necessitated including parts of barren bottoms or not. All areas not delineated as natural bars were to be considered as barren bottoms and opened for leasing. But the submarine land available for private oyster cultivation was further restricted by this Act, which provided that all natural bars were to be bounded by "neutral areas" from fifty (50) to two hundred (200) yards wide (depending upon their location) whereon no person could plant or cultivate oysters. This was the situation in Maryland regarding oyster leasing (except for minor changes) until our present oyster leasing law was enacted.

In connection with the laws with respect to tidewater fishing, considerable controversy developed in respect to the commercial taking of fish, particularly those species which were regarded as game fish. For many years the taking of fish by means of purse nets was pursued by the commercial fishermen. This was found to be a very efficient method and battles raged in the Maryland Legislature for many sessions in an effort to eliminate this method of fishing. A bill outlawing purse nets was finally passed in 1931 (Ch. 175).

Another important controversy had to do with the commercial taking of black bass which many persons regarded primarily as a subject for sport-fishing. The taking of black bass for commercial purposes was outlawed in 1945.

The laws with respect to oysters and oyster culture for many years represented a hodge-podge of miscellaneous enactments extending back over many sessions of the Legislature. The article having to do with oysters was rewritten in 1945 (Ch. 929) and with certain amendments in 1947 of the special session in that year represents the present statute on this important subject.

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